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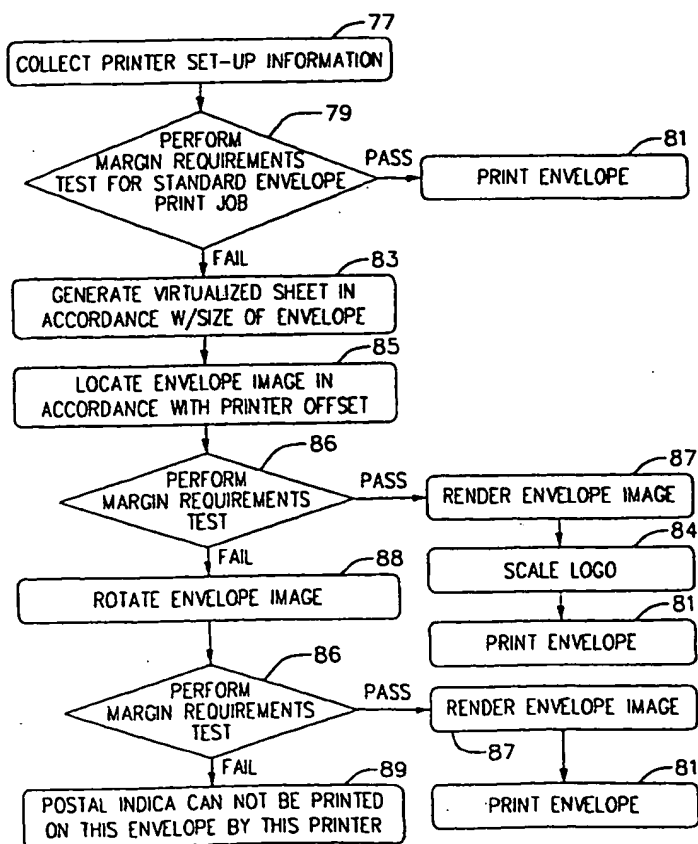
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(54) Title: VIRTUAL PAGE PRINTING OF INDICIA, LOGOS AND GRAPHICS



(57) Abstract: The present invention is directed toward a method and system for printing information onto a print media. In one aspect the present invention may be utilized by an on-line postage system to generate a print job for a virtualized sheet having an image of an envelope contained within a printable region of the virtualized-sheet. The print job for the virtualized sheet is then forwarded to a printer which prints the postal indicia onto the envelope.

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VIRTUAL PAGE PRINTING OF INDICIA, LOGOS AND GRAPHICS

FIELD OF THE INVENTION

The present invention relates generally to systems and methods for printing indicia, logos and graphics and more particularly to systems and methods for printing postal indicia on envelopes.

BACKGROUND

Metered postage is a significant source of revenue for the United States Postal Service (USPS). Metered postage is generated by utilizing postage meters that print a special mark, also known as postal indicia, on mail pieces. Generally, printing postage or any value-bearing items (VBI) may be accomplished with mechanical meters or computer-based systems.

With respect to computer-based postage processing systems, the USPS under the information-based indicia program (IBIP) has published specifications for IBIP postage meters. The IBIP involves the development of new technology to produce new forms of postage. In so-called PC postage systems, a user can purchase postage credit, and print the postage in the form of PC postage onto a label or directly onto a mail piece. The PC postage includes a human readable portion, an indicia graphic and a two dimensional barcode portion. The human readable portion includes the postage value, mail class, the date, the meter number, the licensing post office that a user registered with, an optional logo and optionally also the destination zip code (required for business courtesy mail pieces.) The barcode portion is intended to help thwart fraud, and includes information about the mail piece including the destination ZIP code, the amount of postage applied, the date and time the postage was applied, the meter number and a digital signature so that the USPS can validate the authenticity of the postage.

The USPS mail automation process utilizes various scanning machines when sorting the mail. Therefore, postage indicia must be printed in a prescribed manner to permit the mail handling and optical reading equipment to properly interpret the PC postage and addressee information. Indeed, the USPS has established strict guidelines directed to the margins, label sizes, and placement of the postage indicia, as well as the size, placement, and other characteristics of the POSTNET (POstal Numeric Encoding Technique) bar codes, and any facing identification mark (FIM) on mail pieces. These guidelines are contained in the Domestic Mail Manual (DMM) and Title 39, Code of Federal Register (CFR), Part 111, and USPS Publication No. 25 "Designing Letter Mail".

To ensure that a mail piece can be properly scanned, the mail piece needs to be oriented in a pre-defined manner. Proper orientation of the mail piece is facilitated by means of a FIM barcode or a phosphorescent strip, one of which should be included on each piece of automated mail. However, a FIM in the form of a phosphorescent strip typically requires the use of a specialized envelope or label, since standard printers are unable to print a phosphorescent strip.

1 Referring to FIG. 1, a FIM barcode 8 on the other hand, is simply a pattern of vertical bars printed in the upper right area of a mail piece. Advantageously, the FIM barcode may be printed using the ink from a standard ink jet or laser jet printer. Therefore, indicia-based postage can penetrate the mainstream mass-market more easily with a FIM barcode solution.

5 A FIM barcode is essentially a nine-bit code consisting of bars and spaces (no-bar place holders) in which the bars corresponding to a binary one and spaces correspond to a binary zero. The FIM barcode 8 allows scanning machines to determine the orientation of individual mail pieces and the corners of both sides of the mail piece. Once the scanner has determined where the FIM barcode is on the mail piece, the mail piece may be re-oriented so that the scanner can properly read the delivery information.

10 The aforementioned USPS guidelines require the FIM pattern to be printed in a FIM clear zone, in which no other printing appears. The FIM clear zone is defined as a rectangular zone extending downwardly 0.625" from the upper edge of the mail piece and between 3.0" and 1.75" from the right hand edge of the mail piece.

15 The guidelines further require the bars in the FIM barcode to be $0.625" \pm 0.125"$ high and $0.03125" \pm 0.008"$ wide. Referring to FIG. 2, the rightmost bar of the FIM barcode should be $2" \pm 0.125"$ from the right edge of the mail piece. The top of the bars in the FIM barcode should be no lower than 0.125" from the top of the mail piece and the bottom of the FIM bars should touch the bottom edge of the FIM clear zone but must not be more than 0.125" above or below that edge.

20 Standard printers typically do not support print margins of 0.125" or less. If an envelope is fed to a printer long edge first, the distance from the FIM barcode to the edge is determined by the top margin of the print job created by the printer, which is typically well in excess of 0.125" on standard ink jet and laser jet printers. Similarly, if an envelope is fed to a printer short edge first, the distance from the FIM to the edge of the envelope is still determined by the top margin of the printer because the printer prints the envelope in landscape mode. Again, the top margin is typically greater than 0.125" on most printers Short edge feed is shown in the following diagram., the distance from the FIM barcode to the edge is determined by either the left or right side margin of the printer, which is also typically well in excess of 0.125" on most printers.

25 The inability of most printers to comply with the tolerances set forth for FIM barcode location in the USPS automation system may require printing indicia based postage onto labels and/or envelopes with the FIM barcode pre-printed onto them. Therefore, it would be advantageous to provide a method and system for printing text or graphics within tight edge constraints for use in postage systems that use a printer to print indicia-based postage.

35 SUMMARY OF THE INVENTION

In one aspect of the present invention, a method for printing information onto an envelope includes generating a print job for a virtualized sheet having an image of the information

1 contained within a printable region of the virtualized sheet, and transmitting said print job for said virtualized sheet to a printer.

5 In another aspect of the present invention, a method of printing postal indicia onto a print media includes determining a printer offset as a function of how the mail piece is fed into the printer, generating a print job for a virtualized sheet wherein an image of an envelope is located within a printable region of the virtualized sheet as a function of the printer offset and printing the postal indicia onto the mail piece.

10 In a further aspect of the present invention a method for printing information onto a print media includes generating a print job for a virtualized sheet, wherein an image to be printed on the print media is located within a printable region of the virtualized sheet as a function of printing the image closer to one or more edges of the print media than otherwise allowed by a printer for the print media.

15 In another aspect of the present invention a method for printing postal indicia onto envelopes includes generating a print job for a virtualized sheet having an image of the postal indicia located within a printable region of the virtualized sheet as a function of how the envelope is fed into a printer, performing a margins requirements test, and transmitting the print job to the printer to print the postal indicia as a function of the margin requirements test. The system may also rotate the envelope image as a function of the margin requirements test.

20 In a further aspect of the present invention media that may be read by a computer embodies a program of instructions executable by a computer to perform a method for printing postal indicia onto an envelope, the method includes determining a printer offset as a function of how the envelope is fed into the printer, generating a print job for a virtualized sheet wherein an image of the postal indicia is located within a printable region of the virtualized sheet as a function of the printer offset and printing the postal indicia onto the envelope.

25 BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

30 FIG. 1 is a plan view of an envelope with a barcode printed in accordance with USPS requirements in the upper right hand corner of the envelope;

FIG. 2 is a plan view of an envelope demonstrating the USPS requirements for FIM barcode placement;

35 FIG. 3A is a block diagram of an Internet client/server environment used by an on-line postage system in one embodiment of the present invention;

FIG. 3B is a simplified block diagram illustrating the table used in client and server based printer databases in accordance with an exemplary embodiment of the present invention;

FIG. 4 is a capture of an exemplary print postage dialog screen for a single recipient in

1 accordance with an exemplary embodiment of the present invention;

FIG. 5 is a capture of an exemplary print prompt screen that allows a user to edit the properties of the selected printer and decide whether to print sample or actual postage in accordance with an exemplary embodiment of the present invention;

5 FIG. 6 is a capture of an exemplary print postage dialog screen for multiple recipients in accordance with an exemplary embodiment of the present invention;

FIG. 7 is a capture of an exemplary envelope options screen in accordance with an exemplary embodiment of the present invention;

10 FIG. 8 is a plan view of an envelope with a graphic included in the return address area in accordance with an exemplary embodiment of the present invention;

FIG. 9 is a flow chart demonstrating a process for printing postal indicia on envelopes in accordance with an exemplary embodiment of the present invention;

15 FIG. 10 is a plan view of an envelope demonstrating a virtualization process that re-formats an envelope print job into a print job for a virtual sheet of paper in accordance with an exemplary embodiment of the present invention;

FIG. 11 demonstrates a page layout determining the printable region for a virtualized sheet in accordance with an exemplary embodiment of the present invention;

FIG. 12 demonstrates envelope feed positions for a typical printer;

20 FIG. 13 is a plan view of virtualized sheets demonstrating offsets of the printable region in accordance with an exemplary embodiment of the present invention;

FIG. 14A is a plan view of an envelope with a FIM barcode printed in accordance with the USPS requirements which defines distinct sections between the right hand edge of the envelope and the FIM barcode in accordance with an exemplary embodiment of the present invention;

25 FIG. 14B is a plan view of an envelope with a FIM barcode printed with a large right hand margin and a small logo as well as a small right hand margin and a large logo;

FIG. 15 is diagram illustrating operation of a rendering algorithm to scale the logo as a function of the aspect ratio of a printable bounding area in accordance with an exemplary embodiment of the present invention;

30 FIG. 16A is a plan view of an envelope image that does not pass the margin requirements test;

FIG. 16B is a plan view of the envelope image of FIG. 16A with the image rotated 180° to satisfy the margin requirements test in accordance with an exemplary embodiment of the present invention;

35 FIGS. 17A, 17B and 17C are coordinate axes used for rendering an envelope image with and without image rotation;

FIG. 18 is a plan view of a page layout including a standardized axis for an envelope image without rotation in accordance with an exemplary embodiment of the present invention;

1 FIG. 19 is a plan view of a page layout including a standardized axis for an envelope image with rotation in accordance with an exemplary embodiment of the present invention;

FIGS. 20A-20G demonstrate image rendering for a right feed printer in accordance with an exemplary embodiment of the present invention;

5 FIGS. 21A-21G demonstrate image rendering for a left feed printer in accordance with an exemplary embodiment of the present invention;

FIGS. 22A-22G demonstrate image rendering for a center feed printer in accordance with an exemplary embodiment of the present invention;

10 FIG. 23 is a plan view of an envelope illustrating inverted graphic components of the postal indicia as result of rotating the envelope image;

FIG. 24 is a plan view of an envelope with text components and internal data representation of coordinates for an image of the graphic components of the postal indicia in accordance with an exemplary embodiment of the present invention;

15 FIG. 25 is a logic flow diagram of a getting started printer setup wizard in accordance with an exemplary embodiment of the present invention;

FIG. 26 is a capture of an exemplary select default printer screen in accordance with an exemplary embodiment of the present invention;

FIG. 27 is a capture of an exemplary print onto screen for selecting envelope size and other print options in accordance with an exemplary embodiment of the present invention;

20 FIG. 28 is a capture of an exemplary insert envelope screen that request a user to insert an envelope into the printer feeder so that a sample postage pattern may be printed print onto the envelope in accordance with an exemplary embodiment of the present invention;

25 FIG. 29 is a capture of a compare sample screen wherein a user is requested to compare the sample envelope printed on the envelope to a postage displayed on an envelope on the screen in accordance with an exemplary embodiment of the present invention;

FIG. 30 is a capture of a print quality assurance (QA) screen wherein a user is requested to insert an envelope into the printer feeder so that a QA envelope may be printed in accordance with an exemplary embodiment of the present invention;

30 FIG. 31 is a capture of a mail QA envelope screen reminding the user to mail the QA envelope to the USPS in accordance with an exemplary embodiment of the present invention;

FIG. 32 is a capture of a finish screen informing the user that the set-up program has been successfully completed in accordance with an exemplary embodiment of the present invention;

FIG. 33 is a logic flow diagram of a print configuration wizard in accordance with an exemplary embodiment of the present invention;

35 FIG. 34 is a capture of a test printer screen informing the user that a sample envelope will need to be printed to determine whether the user's printer can accurately print postage in accordance with an exemplary embodiment of the present invention;

FIGS. 35-37 are diagrams illustrating a series of test patterns printed onto a test envelope

1 to determine the printer offset in accordance with an exemplary embodiment of the present invention;

FIG. 38 is a capture of a screen asking which of a plurality of possible test patterns printed onto a test envelope in accordance with an exemplary embodiment of the present invention;

5 FIG. 39 is a capture of a trouble shoot screen asking which of a plurality of possible options a user would like to select to attempt to correct problems printing FIM barcode onto an envelope in accordance with an exemplary embodiment of the present invention; and

FIG. 40 is a capture of a screen informing the user that the current printer is unable to print FIM barcodes onto envelopes in accordance with USPS requirements in accordance with an
10 exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

An exemplary embodiment of the present invention enables postage systems to print indicia-based postage within the constraints established by the USPS. An example of such a
15 postage system is a software-based, on-line postage system described in U.S. Patent Application No. 09/163,993 filed on September 29, 1998, by Mohan Ananda, entitled "On Line Postage System", the contents of which are hereby incorporated by reference as if set forth in full. The on-line postage system software comprises user code or client software that resides on a client system and controller code that resides on a server system. The on-line postage system allows
20 a client to securely print a postal indicium at home, at the office, or any other desired place.

An exemplary online postage system may comprise a user system electronically connected to a server system, which in turn is connected to a USPS system. The server system is preferably capable of communicating with one or more client systems simultaneously. In operation, a
25 licensed and registered client of the on-line postage system sends a request for authorization to print a desired amount of postage. A postal security device (PSD) server determines whether the client's account balance is sufficient to cover the requested amount of postage, and if so, communicates an authorization to the client system. The client system then sends image information for printing a postal indicium for the granted amount to a printer so that the postal
30 indicium is printed on the print media, such as for example, an envelope, post card or label. The printed indicium appears as a two-dimensional bar code that includes a unique serial number, mail delivery point information, and the amount of postage. Once the postage information is printed on an individual piece of mail, it may be mailed and processed by the USPS.

Figure 3 shows a block diagram of an exemplary Internet client/server environment used by the on-line postage system in one embodiment of the present invention. Personal
35 computers(PCs) 10a-10n used by customers of the postage system may be connected to the Internet 12 through communication links 14a-14n. Each PC has access to a printer such as printer 16. Optionally, a local network 18 may serve as the connection between some of the PCs, such as the PC 10a and the Internet 12. Servers 20a-20m are also connected to the Internet 12

1 through respective communication links.

Printing postal indicia requires specific information about a user's printer and its associated printer driver. The servers 20a-20m include information and server based printer databases that is accessible by the PCs 10a-10n. The server based printer database may contain
5 information, such as for example, model number, printer driver, print specifications (margins, etc).

Additionally, a client-based printer database, may be located on the user's machine. The client-based printer database may include a forms database that defines which media types are supported (e.g., envelopes, labels, postcards and the like) and the dimensions of each of these
10 media. In an exemplary embodiment of the present invention the print engine accesses the forms database to locate and print the indicium, delivery address, and return address.

Referring to FIG. 3B, when a user first tries to setup a printer with the client software, the server-based printer database is queried to determine if the user's printer driver information is contained within the database. If the printer information is in the database the required
15 information is available and the user may continue. If the printer driver is not in the database, the user performs several tests to determine the required information with the guidance of a software wizard.

An exemplary on-line postage system preferably provides a print postage interface from which a user may define the postage that is to be printed. An exemplary print postage screen for
20 a single recipient is shown in FIG. 4. The user may enter a return address by typing in a return address box 22. The user may omit the return address by activating a "Do not print the Return Address" option 23. The omit return address option is preferably not active by default. Similarly, a delivery address box 24 preferably allows users to enter a delivery address by typing in the delivery address box 24 or selecting an address from an address book. If a user enters an
25 address which is not in the address book, an exemplary system preferably allows the user to enter the address in the address book. The system preferably displays the address of a single recipient in a format that is substantially the same as the format of the return address displayed in the return address window.

An exemplary print postage screen preferably provides a plurality of toggle buttons 25 that
30 allow a user to select the type of mail piece to be sent, such as for example, a letter, flat, box or oversized box. The postage system preferably uses this information to determine what labels and/or envelopes are available to the user, and to establish the proper postage rate. A letter toggle button 25A is preferably active as the default mail piece type. A description box 26 preferably provides a brief description of the mail type that is currently selected by the mail type toggle
35 buttons 25.

An exemplary print postage screen further includes a print on drop down box 27 which allows users to select from envelopes and labels. The items displayed in the drop down box 27 are preferably determined by the type of mail piece that was selected via the mail type toggle

1 buttons 25. For example, if a letter is selected, only envelopes and labels approved by the USPS
may be available in the print on drop down box 27. Similarly, if a flat or box is selected, only
labels approved by the USPS for the selected flat or box may be available. An exemplary
embodiment of the present invention does not incorporate a default print onto media.

5 An exemplary print postage screen allows a user to enter the weight of an item to be
mailed into weight fields 28A, 28B. The dimensions of the weight fields may be for example
pounds and ounces. An exemplary on-line postage system preferably allows users to integrate
a digital scale into the postage system. The print postage screen preferably provides an interfaces
10 to a digital scale. A scale button 29 on the print postage screen preferably allows for the
automatic retrieval of the weight of the mail piece from the scale. The system preferably displays
this weight in the enter weight fields 28A, 28B. A default weight is preferably 0 lbs., 1 oz. After
the initial use, the fields preferably remember the last value.

A select service control box 30, preferably displays a plurality of available services as well
as the cost of each type of service for the selected mail piece type. The prices preferably update
15 as the user inputs information into the enter weight fields 28A, 28B. If the user is typing a value,
the display may immediately update as the user types. The price may also update as a function
of the delivery address of a mail piece. Once a user has selected a mail service, an indication,
such as for example, a check mark 31 may appear adjacent to the selected service. An exemplary
on line postage screen preferably does not select a default service type.

20 Available postage 32 (reflecting the user's account balance) is preferably displayed on the
print postage screen as is a print preview window 33. The print preview window 33 is preferably
updated in accordance with the media type selected in the "print onto" box 27. The selection of
a print button 34 preferably advances a user to a print prompt screen as shown in FIG. 5. An
exemplary print prompt screen allows a user to edit the properties of the selected printer and
25 decide whether to print sample 35 or actual postage 36. In addition, envelope feed information
37 is preferably provided for the selected printer.

If multiple recipients and or zone based postage rates are selected, the functionality of the
print postage screen may change as shown in FIG. 6. When multiple recipients are selected, each
recipient is preferably displayed as a list 38 with only the name of the individual recipients
30 displayed. In addition, when multiple recipients from multiple zones are entered or selected, the
price 39 of the mail piece going to the individual recipients may be displayed next to their name.
This display preferably appears after a weight that warrants zone based postage has been entered.
The select a mail service dialog box 30 preferably shows a range of prices for the plurality of
mailings. A cost of mailing dialog box 40 preferably appears when multiple recipients are
35 selected. The cost of mailing dialog box 40 preferably displays the total cost for the mailing.

Selection of an options button 41 on the print postage screen preferably advances the user
to an options dialog box, that corresponds to the media type selected in the print onto box 27.
For example, if an envelope is selected in the print onto box, an envelope options screen as

1 shown in FIG. 7 may be launched. An exemplary envelope options screen includes a control 42
to disable FIM barcode printing. This control preferably includes a graphic representation 43 of
a FIM barcode to visually define the term FIM barcode. In addition, the envelope options screen
preferably includes the ability to postdate a mail piece 44 by allowing a user to enter a date in a
5 text edit box 45.

An exemplary envelope options screen further includes a plurality of indicium correction
options 46, such as for example, printing corrected postage 48 or a corrected date 50. A return
address graphic control 52 preferably allows the user to select a graphic to be printed with the
return address. Return address adjustment controls 52 provide the ability to adjust a plurality of
10 features including, for example, the font to be used in the return address and the margins.
Delivery address adjustment controls 54 may also be included.

An exemplary envelope options screen also includes an indicium graphic control 56. The
on-line postage service provider preferably controls the graphic that can be displayed within the
indicium. Therefore, the online postage system preferably provides graphics for the indicium in
15 a digitally signed format, embedded within a DLL. The system may also provide clip art that a
user may browse to select the indicium graphics. The on-line system may provide for
independent downloading of the DLL, so that a clip art library can be updated without forcing
a complete download of the entire client software. If the DLL is not present, this control is
preferably unavailable.

20 The USPS regulations indicate that users may not incorporate a logo into the indicium
without prior approval by the USPS. The USPS regulations greatly restrict a user's ability to
customize the indicium. Therefore, an exemplary on-line postage service provides means by
which users can customize their mail piece with a graphic file of their choosing. The envelope
options screen preferably provides a return address logo control 76 which allows the user to
25 incorporate a graphic 78 into the return address area (see FIG. 8). In an exemplary envelope
options screen a logo is not incorporated into the return address area by default. A browse button
80 is preferably provided to allow a user to open a standard dialog box, from which a user may
browse for and select a return address graphic. A preview window 82 provides a preview of the
selected return address graphic. FIG. 8 illustrates the inclusion of a graphic 78 in the return
30 address area of an envelope.

Referring to FIG. 9, the present invention utilizes a combination of processes to print
postal indicia onto envelopes in accordance with the regulations set forth by the USPS. In an
exemplary embodiment of the present invention, the process of printing postal indicia begins with
the characterization of a default printer through the collection of set-up information regarding that
35 printer's performance characteristics and default settings 77. Set-up information may include for
example, how the printer rotates into landscape mode, what print media/paper the printer
supports, what feed tray options the printer supports or other default information.

In an exemplary embodiment of the present invention, the client software may gather set-

1 up information through database queries or manually with the use of a printer configuration
software wizard. An exemplary embodiment of the present invention creates a dynamic database
that alleviates the need to require all users to provide specific information about their printer.
The dynamic printer database may be updated for the entire user community whenever a user
5 manually sets-up a new printer. In one embodiment, the dynamic database may be maintained
on the server of the postal provider. The dynamic database may contain information, such as for
example, model number, printer driver, print specifications (margins, etc) and which media the
printer is allowed to support as well which media the printer is not allowed to support. This
allows the postal provider to remotely control the type of media and printers that are or are not
10 available for use.

The server-based printer database may use a plurality of tables in a user support database
to store information about printer drivers. For example, a printer configuration information table
may be used to store information on known printer drivers (printer drivers that have been tested
successfully, either in house or by a consensus of users' results) and the print media they support.
15 Similarly a printer global configuration table may be used to store settings that affect all printer
drivers, both known and unknown, and a printer database update table may be used to store the
results generated when a customer configures a previously unknown printer.

In addition to these tables, information that is specific to a customer's printers (i.e. driver
version numbers, whether or not a printer has been configured, etc.) may be stored in the
20 Registry. Each time a user logs into the postal service using the client software, a plurality of
information is preferably sent to the postal service provider over the Internet. For example, the
most recent date when the printer information in the Registry was updated with the printer
information from the server based printer database may be sent. In addition, the names of printer
drivers and printer driver version numbers that are installed on the user's computer are also
25 preferably sent to the postal service provider.

The latest update or server date represents the date when the server-based printer database
was last updated. If the date in the Registry is more recent than this server date, then the server
does not update the printer information in the client based printer database. If the date in the
Registry is earlier or the same as the server date, then updated printer information from the
30 server-based printer database may be returned to the client based printer database. The client
software then preferably updates the printer information in the Registry and updates the date
information with the current system date.

The latest update value is preferably updated each time the Registry information is
compared with the server information. The print engine preferably uses the information in the
35 Registry along with the aforementioned tables in the client support database to determine which
printer drivers are available for use as well as the print media that may be supported by each of
the available printers. If a user works offline, the client software may use Registry values without
being connected to the support server to access the server-based printer database.

1 The printer configuration information table is the main table in the print server database.
It contains information on printer drivers, such as for example, the version number, compatible
operating systems, and the print media the drivers support. The printer configuration information
table may also store the lowest version of the printer driver that meets all the criteria in the table.
5 The printer engine compares the driver version number of a user's printer with the driver
version(s) listed in the database. The printer engine preferably breaks up the string based on
punctuation and then compares the numerical groups. If letters are included in the driver version,
the engine does a character by character comparison.

10 The printer configuration information table may also store an offset or shift code for the
default paper feed tray supported by this driver. The shift code represents how the guides of the
paper feed trays are moved to properly feed envelopes into the printer. The shift code tells the
printer engine where to place the image on the larger virtualized sheet of paper. If the printer
does not shift the image at all, this value is preferably set to zero. If the printer shifts the image
to the middle of the page, this value is preferably set to one. If the printer shifts the image across
15 the page, this value is preferably set to two. A print test may be run to determine the proper shift
code.

20 The printer configuration information table stores a variable indicating whether a given
print driver supports virtualization and printing on envelopes as well as non envelope print media
such as, for example, post cards or labels. If a user attempts to print to a print media not
supported by the selected printer, the system preferably informs the user that their printer does
not support the selected print media and allows the user to select a new printer or select a new
print media.

25 The print media fields in the printer configuration information table are designed to handle
cases where the majority of printer drivers support a print media. For example, while the
majority of printer drivers support personal envelopes, some do not. In these instances, the
personal envelope may still be an option in the "print on" list in the print postage screen. The
system preferably notifies user's who attempt to print to a print media that is not supported by
their printer driver, that the selected printer does not support that print media.

30 The printer configuration information table may also contain a horizontal page offset
variable which is utilized when an image is shifted to the right or left on a label by a minority of
printers but is otherwise properly printed onto the label by a majority of printers. If this occurs,
the image may be translated by the horizontal page offset variable which represents the distance
that the image should be shifted to properly print on the label. Negative values may be used to
move the image to the left and positive values may be used to move the image to the right.

35 Similarly, a vertical page offset value may be stored to compensate for printers that require
the user to move one of the paper feed guides a fixed distance and then to move the other paper
feed guide as needed to fit an envelope. This may result in the default shift code being reported
as a one when it's really a zero or as a two plus the distance that you are required to move the

1 fixed paper guide. When envelopes are printed, the information may be shifted up or down (the
same distance as the fixed-distance paper feed guide) and printed incorrectly on the envelope.
To compensate for this problem, the system preferably stores the distance the image should be
shifted in order to print correctly. Printing on the envelope may be raised, for example, by
5 storing a negative value and lowered by storing a positive value.

A landscape orientation variable may compensate for printer drivers that over rotate the
image, which would otherwise result in the image being shifted horizontally across the page.

The printer global configuration table may be used to control printer driver settings. The
setting of a global variable allows unknown printers and determines if printer drivers that are not
10 in the database will be supported. If unknown printers are not allowed, the system preferably
does not allow a user to configure an unknown printer in a getting started wizard. Rather the
system preferably notifies the user that the selected printer is not supported.

Similarly, the system will not allow a user to select an unknown printer in a print postage
screen. In addition, the setting of a global FIM specification mode variable, determines the
15 distance from the top of an envelope a FIM may be printed when virtualization is not used.
DMM regulations require that the FIM be no lower than 0.125" from the top of the envelope.
This field may be set to allow the FIM to print in accordance with the DMM regulations unless
the regulations regarding FIM placement change.

When a client configures a printer, the results of the configuration may be saved in the
20 printer database update table. As a result, this table contains information about both known and
unknown printer drivers so that there is overlap between the fields of this table and the fields in
the printer configuration information table. The information in the overlapping fields for a new
printer driver may be transferred to the printer configuration information table after numerous
customers, on the order of five to twenty, have successfully configured the printer driver with the
25 same operating system, version number, and shift code.

The system preferably stores a user identification to identify the user that configured the
printer driver in this record. This identification is preferably a unique number assigned to a user
when they registered with the on-line postal provider. The printer database update table may
store the text name of the printer driver that the user configures, the driver version, the computer
30 operating system used when the printer driver was configured and the date the driver was
configured.

Additionally, a client-based printer database, preferably located on the client's machine,
may include a forms database. The forms database defines which media types are supported
(such as, for example, envelopes, labels, postcards and the like) and the dimensions of each of
35 these media so that the printing engine knows where and how to print the indicium.

The forms database preferably stores one record, with a unique identification, for every
print media that the system supports. The database preferably identifies the print media as being
either an envelope or a non-envelope type. The type value tells the print engine which fields it

1 needs to look at in the record. These records correspond to the print on options displayed on the print postage dialog screen in the client software.

5 An exemplary embodiment of the present invention prints on envelopes in accordance with, by way of example, the DMM regulations (e.g., FIM size, placement, the maximum size of the return address, etc.). However, for labels, the system preferably prints in accordance with the label-specific fields in the forms database, for example the fields that define the location for the indicium, return address, and the delivery addresses. The forms database allows each media type stored in the database to be individually enabled or disabled. The system may enable a media type when the media type is first created.

10 A paper height variable may be used to identify the size of the print media. The paper height variable includes the height of the media in standard units such as for example "mils" (1/1000th of an inch increments). Paper height is measured based on the entire length of the media from top to bottom. The paper height variable preferably includes non-printable borders on label sheets or other print media.

15 Similarly, a paper width variable may be used to identify the width of the print media. Again, an exemplary paper width variable includes the entire width of the media from left to right. Also, the forms database preferably includes a paper source variable to assist the operating system to interpret the size of the print media. This field may be for example the standard Windows® code for a paper size.

20 In addition, the system may assign a name to custom paper sources, such as for example a custom label supported by a label printer driver. The client based printer database may include printer groups which group drivers that support a media group. The group drivers may contain the names of the printer drivers that support specific print media. A variable may be included for each driver in a group documenting whether the printer driver supports envelope printing.

25 An exemplary embodiment of the present invention utilizes the printer set-up information to perform a margin requirements test to determine whether the printer in use can print postal indicia in accordance with USPS regulations 79. If the default envelope margin size for the printer in use satisfy the margin requirements the envelope is printed 81. If the default envelope margins do not satisfy the margin requirements an exemplary embodiment of present invention
30 utilizes a virtualized printing process to print postal indicia within the USPS guidelines for PC postage. The client software determines the optimal size 83, location, and orientation to map an image of an envelope onto a virtualized sheet. An exemplary virtualization process preferably supports a plurality of virtual sheet sizes including for example 8 ½" x 11", B5 (182mm x 257mm), or 11" x 17". The size of the virtualized sheet may be determined by the size of the
35 envelope.

Referring to FIG. 10, an exemplary virtualization processes ensures that the envelope image is contained within a "envelope image area" 90 of the virtualized sheet 92. Thus, even though the user inserts an envelope 94 into the printer, the exemplary software preferably sends

1 print commands to the printer for a virtualized sheet 92.

Referring to FIG. 11, the printable region (the area within the dashed lines) of a virtualized sheet 92 may be determined by four margins, namely the top margin 89, bottom margin 91, left margin 93 and the right margin 95. In addition, an exemplary system defines an origin point 97 for the virtualized sheet 92. The origin point 97 is preferably used to calculate the location of the image within the printable region. In portrait mode the edge of the paper that feeds into the printer first is known as the leading edge 91. In portrait mode the system preferably places the origin point 97 at the left corner of the leading edge of the virtual sheet. If the print job is rotated into landscape mode, the system moves the origin to the opposite edge of the sheet, known as the trailing edge.

Printer virtualization preferably orients the FIM barcode near the middle of the virtualized sheet thereby alleviating any physical margin constraints that might otherwise prevent a printer from printing the FIM barcode within 0.125" from the top of the envelope. In fact, the use of print commands for a virtualized sheet may allow the FIM barcode to be printed up to the edge of the envelope.

Printer offset or shift code is a variable dependent upon how an envelope is fed into a printer. Referring back to FIG. 9, the client software uses the printer offset to locate the envelope image within the printable region of the virtualized sheet 85. Envelopes are fed into printers by means of feed trays. Feed trays typically have guides that align the print media to prevent it from skewing. However, the location of the feed tray and the way in which the envelopes are loaded may vary from printer to printer. Therefore, the printer offset variable may also vary from printer to printer.

For example, referring to FIG. 12 the paper guides may load the envelope from the left, right, or center of the feed tray. In addition, the feed trays can be physically located in various places on the printer, for example on the top, front, back, or sides of the printer. The different locations of the feed trays make it difficult to classify printers (that don't feed from the center) as left or right. Therefore, an exemplary embodiment of the present invention classifies printer offset in terms of top and bottom offsets rather than left and right.

In an exemplary embodiment of the present invention the origin or reference point for the virtualized sheet is used to calculate the location of the envelope image. Referring to FIG. 13, printer offset may then be defined in terms of the vertical relationship between the envelope image and the origin of the virtualized sheet. If the set-up information on the print driver of the user's printer was not in the dynamic printer database, an exemplary embodiment of the present invention utilizes a wizard program to initially determine printer offset. The wizard program preferably generates one or more test shapes that are printed on a test envelope by the user's printer. Printer offset may then be defined by determining which of these shapes actually gets printed onto an envelope, (i.e., whether it is a top 108, bottom 104, or center 106 offset).

Once an offset is determined for a given printer the offset is preferably stored in the

1 dynamic printer database so that future users who have the same printer may not have to exercise the wizard program to determine the printer offset. Rather, future users preferably obtain the offset information from the dynamic printer database. Once the system determines the offset, the envelope image may be located within the printable region of the virtualized sheet.

5 Portrait mode is the default orientation of a normal print job. However, since envelopes are typically printed in landscape mode the system software preferably modifies the printer setting from "portrait" to "landscape" mode. Printers handle the landscape mode in different manners. Some printers rotate the portrait image 90° to create a landscape image while others rotate the portrait image by 270°. Therefore, the ultimate location and orientation of the envelope image within the printable region of the virtualized sheet depends on the rotation
10 undertaken by the printer to achieve landscape mode.

Referring back to FIG. 9, when the envelope image is properly located in the printable region of the virtualized sheet in accordance with the printer offset, the client software again performs a margins requirements test to determine whether the printer in use can print postal indicia in accordance with USPS regulations 86. If the margins for the virtualized sheet satisfy the margin requirements the client software uses rendering algorithms 87 to relocate the origin of the virtualized sheet to print the postal indicia onto the envelope 81.

As part of the rendering process, an exemplary embodiment of the present invention may incorporate a logo of the postal service provider in the postal indicia. Rather than integrating a single, static logo, the print engine preferably accommodates a scalable logo 84. In order to conform to the FIM placement standards which require that the FIM consistently be printed 2" +/- 1/8" from the right-hand edge of the envelope, the space available between the FIM and the human-readable portion of the indicium changes depending upon the right-hand margin of the printer.

25 Referring to FIG. 14A the area between the right edge of the FIM barcode and the right hand edge of the envelope can be divided into a plurality of distinct sections, described as follows:

- "A" is the distance from the edge of the indicium to the edge of the paper. In many cases, this distance is determined by the physical margin of the printer, and is therefore a variable amount.
- "B" is the width of the human readable portion of the indicium. This width is preferably fixed.
- "C" is the width of a logo graphic. This width may be variable.
- "D" is the width of a FIM clear zone. Its width should also be fixed.

35 To satisfy the requirements promulgated by the USPS the distinct sections involved in locating the FIM barcode from the right hand edge of the envelope may be constrained as follows:

$$1.875" < A + B + C + D < 2.125" \quad (1)$$

1 Since B, the width of the human readable portion, and D the width of a FIM clear zone are preferably fixed, the system preferably reduces the size of C (the logo) when A (the printer margin) increases, to satisfy the above equation. Similarly, when A (the printer margin) decreases, the system preferably increases the size of C (the logo) so as to increase the branding within the indicium. A right hand margin (A) of about 7/10" or less allows the client software to print a logo (C) in the postal indicium. Generally, for a particular printer, the logo size will be constant for all envelope jobs.

5 An exemplary embodiment of the present invention shifts the human readable portion in accordance with the printer margin and scales the logo in a manner that maximizes the size of the logo while preserving the validity of the equation above. Referring to FIG. 14B, when a large printer margin 96 is required, a small logo 98 is preferably printed. Similarly, when a small margin 100 is allowed, the human readable portion shifts towards the edge of the envelope and a larger logo 102 is preferably printed. The latter is generally preferable since it provides more prominent branding and is considered more aesthetically appealing to the user.

10 Referring to FIG. 15, an exemplary rendering algorithm for scaling the logo while maintaining the validity of Equation (1) above defines a printable bounding area 103 or a bounding rectangle and scales the logo to fit into the printable bounding area. Referring back to FIG. 14, the width of the printable bounding area is the distance between the human readable portion and FIM clear zone. The height of the printable bounding area is equal to the distance between the two dimensional bar code and the edge of the print media.

15 Referring back to FIG. 15, in operation the described exemplary rendering algorithm determines the aspect ratio (defined as the width/height) of the bounding area as well as the aspect ratio of an image area 107 that bounds the logo. If the aspect ratio of the bounding area is greater than the aspect ratio of the image area the rendering algorithm may scale the image to fill the printable bounding area. The rendering algorithm may create a vertical scale factor, defined as the height of the bounding area divided by the height of the image area, and scale the image vertically by multiplying the image height by the vertical scale factor. Further the rendering algorithm may create a horizontal scale factor defined as the width of the bounding area divided by the width of the image area, and scale the image horizontally by multiplying the width of the image area by the horizontal scale factor.

20 An exemplary rendering algorithm for scaling the logo may best be demonstrated with an example. Therefore for purposes of illustration only, assume a printable bounding area has a width equal to eight and a height equal to four and therefore an aspect ratio of two. Further assume an image area has a width of three and height of three and therefore an aspect ratio of one. In this instance the vertical and horizontal scale factors are equal to 4/3 so that the image area may be scaled horizontally, vertically or both with a scale factor of 4/3.

25 Referring back to FIG. 9, if the margins for the virtualized sheet do not satisfy the margin requirements an exemplary embodiment of the client software rotates the envelope image one

1 hundred and eighty degrees 88. In these cases, the client software preferably queries the server based printer database to determine if the user's printer and print drivers are capable of error free rotation. The system preferably limits rotation to cases where the server based printer database certifies that the printer and print drivers support rotation without error.

5 Referring to FIG. 16A, in operation the client software preferably checks the margin requirements (top margin less than or equal to 0.125" and right margin less than or equal to 0.70") to determine whether the image will properly print onto the envelope in accordance with USPS requirements. Referring to FIG. 16B, if the margins of the virtualized sheet do not satisfy the margin requirements the client software rotates the envelope image.

10 Referring back to FIG. 9 the client software tests the margin requirements again 86 after rotation. If the margins of the virtualized sheet, with the rotated image, fail to satisfy the margin requirements, the client software cannot print the envelope 89. If the margins of the virtualized sheet satisfy the margin requirements with rotation the client software renders the envelope image 87 and prints the envelope 81. Thus, the rotation process can help determine the ultimate orientation of the envelope image on the virtual sheet of paper.

15 To print postal indicia, the client software preferably uses a drawing surface to render an envelope image contained in a printable region of a virtualized sheet. The drawing surface may be used to calculate the location of each character to be printed. The drawing surface is preferably represented by a coordinate system having a logical origin. Each point on the coordinate space is represented by a set of coordinates, X and Y, (x,y). The (x,y) coordinates determine the precise location of the object to be drawn. Microsoft Windows supports four different coordinate spaces.

20 The attributes of a particular coordinate system are defined by the mapping mode. Page-space coordinates set the mapping mode. The mapping mode defines the unit of measure used to translate the page-space coordinates into the device-space coordinates used by a printer, and also defines the orientation of the device's x and y axes. For example, in HiEnglish mapping mode, each unit in the page-space coordinates is mapped to 0.001" in device-space coordinates and the value of X increases to the right and Y increases up from the bottom.

25 To support printing to a particular printing device, the client software preferably maps or copies the page area from one coordinate space to another. The client software initially renders the objects on a coordinate space called page space (sometimes referred to as logical space) using a modified Hi English mapping mode and translates the objects to the device coordinate space.

30 Referring to FIG. 17A, an exemplary embodiment of the present invention utilizes a standard x and y coordinate system. To standardize the coordinate area, an exemplary embodiment of the present invention preferably flips the x axis and y axis to support rotations that are necessary to print the image. The client software uses Windows mapping code that allows the axes to be flipped and creates a custom mapping code.

35 FIG. 17B shows the axes used by the client software for envelopes without rotation. The

1 action of flipping forms a standard coordinate space with the positive x axis pointing to the right and the positive y axis pointing down. Similarly, FIG. 17C shows the custom axes used by the client software for envelopes with rotation.

5 Referring to FIG. 18, the origin 109 of the virtualized sheet is preferably located at the top left-hand corner of the printable region of the virtualized sheet (the envelope.) The x and y coordinates may then be calculated from the origin. For example, if the positive X axis points to the right and the value of X is five, an exemplary drawing routine translates to the right side of the origin five units. Alternatively, if the positive X axis points to the left side and the value of X is five, the system drawing routine translates to the left side of the origin five units.
10 Referring to FIG. 19, when the envelope image is rotated, the client software flips the X-axis so the positive X-axis points to the left direction and the positive Y-axis points upward.

If the origin is not at the top-left corner of the envelope, the client software translates the origin of the virtual sheet to the top-left corner of the envelope. For top, center or bottom offset printers the origin of the virtualized sheet preferably translates in the positive X direction a
15 distance equal to the value of the paper-width minus envelope-width. Similarly, for center offset printers the origin preferably shifts in the positive y direction a distance equal to the value of (the paper-height minus envelope-height) divided by two. For bottom offset printers the origin preferably shifts in the positive y direction a distance equal to the value of the paper-height minus envelope-height.

20 In addition, the server based printer database may contain shift overrides. An exemplary embodiment of the present system preferably queries the server based printer database to determine if shift overrides exist and if so applies those overrides. An exemplary system further determines whether the image should be rotated. If so the software preferably translates the origin diagonally across the envelope image. To shift the image, the x axis translates in the
25 positive X direction a distance equal to the value of the (envelope-width minus the left margin width) minus the width of the right margin. In addition, the y axis translates in the positive y direction a distance equal to envelope height minus the height of the top margin. The rendering process translates the logical coordinates of the image to device coordinates of the printer to correctly locate and print the indicia on the mailpiece.

30 The operation of an exemplary image printing process may be best demonstrated with a series of examples. FIG. 20A shows a right hand feed printer with a printable location in the portrait mode. As shown in FIG. 20B when the printer rotates 270° into landscape mode the origin 109 of the virtualized sheet is at the leading edge 110 of the virtualized sheet. An exemplary embodiment of the present invention performs a margin requirements test to
35 determine if the printer top margin 111 (relative to the origin of the virtual sheet) is less than 0.125" (to support FIM printing to USPS requirements) and the right margin 112 is less than 0.70" (to allow a logo of the postal service provider to be included in the indicium). If the image satisfies the margin requirements the postal indicia prints correctly onto the envelope as shown

1 in FIG. 18D.

However, referring to FIG. 20C, if the image does not meet the margin requirements, the client software rotates the image 180°, and tests the margins again. To perform the margin requirements test with a rotated the image, the client software substitutes the bottom margin for the top margin and the left margin for the right margin. Thus the bottom margin should now be less than 0.125" and the left margin should now be less than 0.70". If the rotated image satisfies the margin requirements the client software may use rendering algorithms to relocate the origin and print the image correctly.

Referring to FIG. 20E when a right hand feed printer rotates 90° into landscape mode the origin 109 of the virtualized sheet is not located at the leading edge 110 of the virtualized sheet. An exemplary embodiment of the present invention performs a margin requirements test to determine if the envelope image satisfies the predetermined margin requirements, (i.e. printer top margin is less than 0.125" and the right margin is less than 0.70"). If the image passes the margin requirements test the postal indicia prints correctly onto the envelope as shown in FIG. 20G.

However, referring to FIG. 20F, if the envelope does not meet the margin requirements test, the postal indicia, including FIM barcode may be located outside the printable region of the virtualized sheet and the envelope may fail the USPS requirements for FIM barcode placement. The client software therefore, rotates the image 180°, and performs the margin requirements test again. If the image satisfies the margin requirements the client software uses rendering algorithms to print the postal indicia onto the envelope. In this instance the origin is preferably shifted across and down the page so that the image may be correctly printed.

Similarly, FIG. 21A shows a left hand feed printer with a printable location in the portrait mode. As shown in FIG. 21B when the printer rotates 270° into landscape mode the origin 109 of the virtualized sheet is located at the leading edge 110 of the virtualized sheet. An exemplary embodiment of the present invention performs a margin requirements test to determine if the envelope image satisfies the predetermined margin requirements, (i.e. printer top margin is less than 0.125" and the right margin is less than 0.70"). If the image satisfies the margin requirements the postal indicia prints correctly onto the envelope without image rotation as shown in FIG. 21D. The client software may therefore use rendering algorithms to relocate the origin and print the envelope.

However, referring to FIG. 21C, if the image does not meet the margin requirements, the client software rotates the image 180°, and performs the margin requirements test again. If the image satisfies the margin requirements, the client software may use rendering algorithms to relocate the origin and print the image correctly.

Referring to FIG. 21E when a left hand feed printer rotates 90° into landscape mode the origin 109 of the virtualized sheet is not located at the leading edge 110 of the virtualized sheet. An exemplary embodiment of the present invention performs a margin requirements test to determine if the envelope image satisfies the predetermined margin requirements, (i.e. printer top

1 margin is less than 0.125" and the right margin is less than 0.70"). If the image passes the margin requirements test the postal indicia prints correctly onto the envelope without rotation as shown in FIG. 21G. The client software uses rendering algorithms to shift the origin and print the postal indicia onto the envelope.

5 However, referring to FIG. 21F, if the envelope image does not meet the margin requirements, the postal indicia, including FIM barcode may be located outside the printable region of the virtualized sheet and the envelope may fail the USPS requirements for FIM barcode placement. The client software therefore, rotates the image 180°, and performs the margin requirements test again. If the image satisfies the margin requirements the client software uses rendering algorithms to print the postal indicia onto the envelope. In this instance the origin is preferably shifted across and down the page so that the image may be correctly printed.

10 As a further example, FIG. 22A shows a center feed printer with a printable location in the portrait mode. Referring to FIG. 22B, when the printer rotates 270° into landscape mode the origin 109 of the virtualized sheet is at the leading edge 110 of the virtualized sheet. An exemplary embodiment of the present invention performs a margin requirements test to determine if the envelope image satisfies the predetermined margin requirements, (i.e. printer top margin is less than 0.125" and the right margin is less than 0.70"). If the image passes the margin requirements test the postal indicia prints correctly onto the envelope without image rotation as shown in FIG. 22D. The client software may therefore use rendering algorithms to relocate the origin and print the envelope.

20 However, referring to FIG. 22C, if the image does not meet the margin requirements, the client software rotates the image 180°, and performs the margin requirements test again. If the image satisfies the margin requirements, the client software may use rendering algorithms to relocate the origin and print the image correctly.

25 Referring to FIG. 22E when a center fed printer rotates 90° into landscape mode the origin 109 of the virtualized sheet is not located at the leading edge 110 of the virtualized sheet. An exemplary embodiment of the present invention performs a margin requirements test to determine if the envelope image satisfies the predetermined margin requirements, (i.e. printer top margin is less than 0.125" and the right margin is less than 0.70"). If the image passes the margin requirements test the postal indicia prints correctly onto the envelope without rotation as shown in FIG. 22G. The client software uses rendering algorithms to shift the origin down and across and print the postal indicia onto the envelope.

30 However, referring to FIG. 22F, if the envelope does not meet the margin requirements, the postal indicia, including FIM barcode may be located outside the printable region of the virtualized sheet and the envelope may fail the USPS requirements for FIM barcode placement. The client software therefore, rotates the image 180°, and performs the margin requirements test again. If the image satisfies the margin requirements the client software uses rendering algorithms to print the postal indicia onto the envelope. In this instance the origin is preferably

1 shifted across and down the page so that the image may be correctly printed. Thus, the rotation process can help determine the ultimate orientation of the envelope image on the virtual sheet of paper.

5 In the described exemplary embodiment the client software flips the X-axis so the positive X-axis points to the left when the envelope image is rotated. Certain printers may not be able to support flipping the X-axis. As a result, these printers may print the postal indicia with the graphic portion inverted or without the graphic altogether (see FIG. 23). Therefore, an exemplary embodiment of the client software preferably includes a two pass graphic rendering routine that allows the client software to separately render the textual and graphic components of the
10 mailpiece.

In operation, the client software performs a first set of adjustments to the drawing surface and renders the textual components, including the delivery address 114, the return address 115 and the indicium 116 of the mailpiece. The client software preferably stores the image information for the graphic components as well as the corner coordinate points of the location
15 where the image of the graphic components are to be printed (see FIG. 24).

The graphic components include the 2-d Bar code 117, the return address graphic 118, the indicium graphic 119 and the service provider logo 120. Once the textual information is rendered, the client software preferably adjusts the drawing surface a second time. In the described exemplary embodiment, the client software resets the mapping mode to MM_TEXT,
20 each logical pixel maps to a physical device pixel, the positive X axis points to the right, and the positive Y axis points downward. The client software traverses the list of saved images of the graphic components, rendering them for printing using the new coordinates.

However, the axes have been flipped in the opposite direction from the standard rotated mode. Therefore, the client software preferably rotates the images of the graphic components
25 180°. In an exemplary embodiment of the client software, the images of the graphic components are rotated in memory using standard image processing techniques. Upon completion of printing the client software refreshes the drawing surface to its original state before any adjustments were made.

An exemplary embodiment of the present invention includes various print setup wizards,
30 such as for example, print verification, print QA envelope and determine top, center or bottom envelope feed. The print setup wizards are preferably stored in a printer setup portion of a getting started wizard that a user may execute before utilizing the software.

An exemplary logical flow diagram of the printer setup component is shown in FIG. 25. An initial default printer selection screen 121 allows the user to select a default printer. A print
35 onto screen 122 then prompts the user to select an envelope size to be used for printer setup testing. Next the system may determine 124 whether the default printer selected by the user is stored in the server based printer database. If the default printer is not included in the database the system defaults to a printer trouble shoot wizard 126 to determine the feed offset for the

1 selected default printer.

If the default printer is included in the database an insert envelope screen 128 preferably prompts the user to insert an envelope into the printer to complete further setup testing. The system then prints a test sample 130 onto the envelope inserted into the printer. A compare sample screen 132 preferably then prompts the user to compare 134 the printed postage sample with a representative envelope displayed on the screen. If the postage sample printed on the envelope does not match the postage on the displayed envelope the system may again default to a printer trouble shoot wizard 136 to determine the feed offset for the selected default printer. If the printed sample matches the displayed postage the system may upload 138 print parameters for the selected default printer into the server based print database.

The USPS requires users of computer-based postage processing systems to mail in an actual postage sample printed on what is known as a quality assurance (QA) envelope. The USPS utilizes the QA envelope to confirm that the printed postage complies with the promulgated USPS standards. Since the QA envelope must include valid postage the system preferably determines whether the user's account balance 140 is sufficient to cover the postage. If the account balance is sufficient a print QA envelope screen 142 may inform the user as to the requirements for a QA envelope and prompts the user to insert an envelope into the printer. The system may then print 144 a valid postal indicum onto the inserted envelope. A mail QA envelope screen 146 may then prompt the user to forward the QA envelope to the USPS. A finish screen 147 may then inform the user that the set-up wizard has been successfully completed.

FIG. 26 shows an exemplary select default printer screen 121. The select default printer screen 121 may inform the user that sample patterns need to be printed to verify compliance with USPS requirements. A drop down box 155 may display the printers that are installed on the user's system, and allow the user to select a default printer. The default printer selection is preferably incorporated into the standard print prepare dialog box, and therefore remains the default printer until the user selects otherwise. In the described exemplary embodiment, a "Next>" button 156 is not available until the user selects a default printer.

Referring to FIG. 27, an exemplary print onto screen 122 may allow the user to select information needed to support the print test functions. For example, a drop down box 157, may be used to allow users to select the size of the envelope to be used throughout the tests. The user may also be allowed to omit the return address. For example, the user may be allowed to select a "yes" button 158 with the mouse to print the return address or a "no," button 159 to prevent the return address from printing.

The user's selections may be stored and used for all testing undertaken within the print setup wizard. The information that is gathered here may also be used to populate the corresponding fields within the print postage and print options dialog boxes when the user first launches these screens. In an exemplary embodiment of the present invention, a "Next>" button

1 160 is not available until the user selects an envelope size and answers the yes/no question.

Referring to FIG. 28, an exemplary insert envelope screen 128 notifies the user that postage is about to be printed, and instructs the user to load an envelope into the feeder. A graphic 162 of an envelope being placed into a printer is preferably used to help re-enforce the action to the user. This screen may be used multiple times during the printer setup portion of the getting started wizard. A "Next>" button 164 may be immediately available. When the "Next>" button is selected, a sample Quality Assurance (QA) envelope is preferably printed.

Referring to FIG. 29, an exemplary compare sample screen 132 prompts the user to compare the QA envelope with the envelope 166 displayed on the screen. The QA envelope preferably contains, FIM barcode, a human readable portion 167 and a two dimensional barcode portion 169. The human readable portion 167 may contain the postage value, mail class, the date and the meter number. In addition, a logo 171 and the destination zip code may be included. The two dimensional barcode 169 is intended to help thwart fraud, and may include information about the mail piece, such as for example, the destination ZIP code, the amount of postage applied, the date and time the postage was applied, and a digital signature so that the USPS can validate the authenticity of the postage. The user preferably verifies that each of the postal indicia features printed on the QA envelope match those displayed on the compare sample screen 132. In an exemplary embodiment of the present invention, neither a "yes" radio button 168 or a "no" radio button 170 is selected by default. A "Next>" button 172 is preferably not available until the user selects either the yes or no button.

Referring to FIG. 30, an exemplary print QA screen 142 is similar to the insert envelope screen. The print QA screen 142 may educate 174 the user about the purpose of and requirements for QA envelopes. In addition the print QA screen 142 may instruct the user to load an envelope into the feeder because postage is about to be printed. A graphic 176 of an envelope being placed into a printer may be used to help re-enforce the action to the user. Further, the user may also be informed that the USPS requires QA envelopes to include valid postage and that the user's account will be debited for this postage. A "Next>" button 178 may be immediately available. When the "Next>" button 178 is selected, a QA envelope is printed.

Referring to FIG. 31, an exemplary mail QA envelope screen 146 preferably instructs the user to promptly mail the QA envelope or the user's meter license may be revoked. A graphic 180 of an envelope being placed into a mail box may be used to help re-enforce the action to the user. A "Next>" button 182 may be immediately available.

Referring to FIG. 32 an exemplary finish screen 147 may be used to congratulate the user for completing the set-up wizard, and to launch online postal service software. A "Finish" button may be available immediately. Once the "Finish" button has been selected, the client software is preferably launched.

A print configuration wizard may be initiated if print parameters for the default printer are not stored in the server based printer database, or if the sample QA envelope (see FIG. 25) does

1 not match the displayed envelope. A logic flow diagram of an exemplary print configuration wizard is shown in FIG. 33. Referring to FIG. 34, a test printer screen preferably prompts the user to place an envelope in the printer feed tray. The test printer screen advises the user that a sample envelope needs to be printed to determine whether the user's printer can print postal indicia and instructs the user to insert the envelope short edge first 183. When the user selects "Next>", a test pattern including, for example, a circle, a square, and a triangle may be printed 186 (FIG. 33) on the envelope inserted into the printer.

5 One of ordinary skill in the art will appreciate that the test pattern is not limited to the described combination of shapes. Rather the test pattern may comprise, for example, any combination of shapes, symbols, letters or numbers. Alternatively, a single character may also be used, wherein the printer offset may be determined in accordance with how the single character prints on a test envelope. Therefore, the described test pattern is by way of example and not by way of limitation.

10 The client software preferably draws all three shapes on a virtualized sheet. In an exemplary embodiment, only one of the shapes completely prints onto the envelope in accordance with how an envelope is fed into the printer. For example, in an exemplary embodiment a top feed printer (see FIG. 35) results in a circle being printed onto a test envelope, wherein a square pattern indicates a center feed printer (see FIG. 36) and a triangle pattern indicates a bottom feed printer (see FIG. 37). The top, center or bottom designations are in reference to the location of the origin on the virtualized paper.

15 Referring to FIG. 38, the system preferably asks the user to select which shape printed on the envelope 188 by for example, selecting one of a series of buttons 190, each of which corresponds to one of the particular shapes in the test pattern. Based upon this result, the system may determine the appropriate offset. Referring back to FIG. 33, the offset information may be sent to the server 192, and the user preferably continues with the insert envelope screen 128 within the printer setup flow diagram shown in FIG. 25.

20 If the user selects "none of the above match what I see" on FIG. 38, a trouble shoot screen 194 may appear as shown in FIG. 39. The trouble shoot screen 194 preferably presents the user with a series of options and preferably prompts the user to select an option, by for example, selecting one of a series of buttons, each of which corresponds to a particular option. Possible options may include for example:

- Try printing another sample 196. If the user selects this option, a different test pattern is sent to the printer, so that the comparison process may be undertaken again.
- Try printing another sample to a different printer 198. Selecting this option links the user back to the select default printer screen 121 of the print setup logic flow diagram (see FIG. 25), thus allowing the user to select another printer and start the process again.

1 • Neither of these solutions work 200. Selecting this option indicates that the system cannot determine a feed offset and therefore cannot print envelopes using the user's printer.

5 If the user selects "neither of these solutions work" from the plurality of options on FIG. 39, the system preferably informs the user that the current default printer does not support USPS requirements 202 and that the current printer is not able to print postage onto envelopes, only onto labels (see FIG. 40). A "Next>" button 204 may be immediately available. When the Next button 204 is selected, the client software preferably disables printing to envelopes 206 (see FIG. 33).

10 Although a preferred embodiment of the present invention has been described, it should not be construed to limit the scope of the appended claims. For example, the present invention may be implemented by a variety of computer based postage metering systems in accordance with a variety of print requirements promulgated by postal systems around the world. Further, although the operation of the present invention has been demonstrated in accordance with USPS requirements for PC based postal printing, the present invention is not limited to applications in accordance with the USPS requirements. Rather, the present invention is equally applicable for operation in all PC postal printing systems,

15 In addition, those skilled in the art will understand that various modifications may be made to the described embodiment. Moreover, to those skilled in the various arts, the invention itself herein will suggest solutions to other tasks and adaptations for other applications. It is therefore desired that the present embodiments be considered in all respects as illustrative and not restrictive, reference being made to the appended claims rather than the foregoing description to indicate the scope of the invention.

1 WHAT IS CLAIMED IS:

1. A method of printing postal indicia onto a print media comprising:
determining a printer offset as a function of how the print media is fed into a printer; and
generating a print job for a virtualized sheet wherein an image of said postal indicia is
5 located within a printable region of the virtualized sheet as a function of said printer offset.

2. The method of claim 1 further comprising printing said postal indicia onto said
print media.

10 3. The method of claim 1 further comprising determining size of said virtualized sheet
as a function of size of the print media.

4. The method of claim 1 wherein the step of determining said printer offset comprises
sending a print job having one or more patterns to said printer and determining said printer offset
15 as a function of how one or more of said patterns prints on a test print media.

5. The method of claim 1 wherein the step of determining said printer offset
comprises:

selecting a printer; and

20 determining the printer offset for the printer from a printer database having information
on one or more printer drivers.

6. The method of claim 1 wherein the step of determining said printer offset
comprises:

25 selecting a printer; and

determining the printer offset for the printer from a printer database having information
on one or more printers.

7. The method of claim 2 wherein the step of printing said postal indicia comprises
30 printing a FIM.

8. The method of claim 7 wherein the step of printing said FIM further comprises
printing said FIM within a predefined distance of an edge of said envelope.

35 9. The method of claim 7 wherein the step of printing said FIM further comprises
printing said FIM within a distance of 0.125" of an edge of said envelope.

10. The method of claim 2 wherein the step of printing said postal indicia comprises

1 printing a human readable portion.

11. The method of claim 10 wherein the step of printing said human readable portion comprises printing a logo.

5 12. The method of claim 11 further comprising scaling the logo as a function of said printable region of said virtualized sheet.

10 13. The method of claim 2 wherein the step of printing said postal indicia comprises printing a two dimensional barcode portion.

14. The method of claim 2 further comprising encoding a digital signature into a two dimensional barcode, wherein the step of printing said postal indicia comprises printing said two dimensional bar code.

15 15. The method of claim 1 further comprising rotating the image of said postal indicia as a function of the printable region of said virtualized sheet.

20 16. The method of claim 15 further comprising translating an origin of said virtualized sheet and rendering the image of said postal indicia as a function of said translated origin.

17. The method of claim 15 further comprising:
performing a first set of adjustments to a drawing surface;
rendering a first component of said postal indicia in accordance with the first set of
25 adjustments to said drawing surface;
storing location of a second component of said postal indicia in accordance with first set
of adjustment to said drawing surface;
performing a second set of adjustments to the drawing surface; and
rendering said second component of said postal indicia in accordance with the second set
30 of adjustments to the drawing surface.

18. A method of printing postal indicia onto an envelope comprising:
generating a print job for a virtualized sheet wherein an image of said postal indicia is
located within a printable region of the virtualized sheet as a function of how said envelope is fed
35 into a printer;
performing a margins requirements test; and
transmitting said print job to said printer to print said postal indicia as a function of said
margin requirements test.

1 19. The method of claim 18 further comprising rotating said image as a function of said
margin requirements test.

5 20. The method of claim 19 further comprising translating an origin of said virtualized
sheet and rendering said image of said envelope as a function of said translated origin.

10 21. The method of claim 18 further comprising determining a printer offset as a
function of how said envelope is fed into said printer, wherein said image of said envelope is
located in said printable region as a function of said printer offset.

15 22. The method of claim 21 wherein the step of determining said printer offset
comprises sending a print job having one or more patterns to said printer and determining said
printer offset as a function of how said pattern prints on a test envelope.

20 23. The method of claim 21 wherein the step of determining said printer offset
comprises:

 selecting a printer; and

 determining the printer offset for the printer from a printer database having information
on one or more printer drivers.

25 24. The method of claim 18 wherein the step of printing said postal indicia comprises
printing a FIM.

30 25. The method of claim 24 wherein the step of printing said FIM further comprises
printing said FIM within a predefined distance of an edge of said envelope.

35 26. The method of claim 18 the step of printing said postal indicia comprises printing
a human readable portion.

 27. The method of claim 26 wherein the step of printing said human readable portion
comprises printing a logo.

 28. The method of claim 27 further comprising scaling the logo as a function of said
printable region of said virtualized sheet.

 29. The method of claim 18 wherein the step of printing said postal indicia comprises
printing a two dimensional barcode portion.

1 30. A method of printing onto a print media comprising:
generating a print job for a virtualized sheet, wherein an image to be printed on said print
media is located within a printable region of said virtualized sheet as a function of printing said
image closer to one or more edges of said print media than otherwise allowed by a printer for said
5 print media.

 31. The method of claim 30 further comprising printing said image onto said print
media.

10 32. The method of claim 30 further comprising determining size of said virtualized
sheet as a function of size of the print media.

 33. The method of claim 30 further comprising determining a printer offset as a
function of how said print media feeds into said printer, wherein said image is located within said
15 printable region of said virtualized sheet as a function of said offset.

 34. The method of claim 33 wherein the step of determining said printer offset
comprises sending a print job having one or more patterns to said printer and determining said
printer offset as a function of how one or more of said patterns prints on a test print media.

20 35. The method of claim 33 wherein the step of determining said printer offset
comprises:

 selecting a printer; and
 determining the printer offset for the printer from a printer database having information
25 on one or more printer drivers.

 36. The method of claim 31 wherein the step of printing said image comprises printing
a postal indicia.

30 37. The method of claim 36 wherein the step of printing said postal indicia further
comprises printing a FIM within a predefined distance of an edge of said envelope.

 38. The method of claim 30 further comprising rotating the image as a function of the
printable region of said virtualized sheet.

35 39. The method of claim 38 further comprising translating an origin of said virtualized
sheet and rendering the image as a function of said translated origin.

1 40. The method of claim 38 further comprising:
performing a first set of adjustments to a drawing surface;
rendering a first component of said image in accordance with the first set of adjustments
to said drawing surface;
5 storing location of a second component of said image in accordance with first set of
adjustment to said drawing surface;
performing a second set of adjustments to the drawing surface; and
rendering said second component of said image in accordance with the second set of
adjustments to the drawing surface.

10 41. A system for printing postal indicia comprising:
means for determining a printer offset as a function of how an envelope is fed into said
printer;
means for generating a print job for a virtualized sheet, wherein an image of said postal
15 indicia is located within a printable region of the virtualized sheet as a function of said printer
offset; and
a printer for printing said postal indicia onto said envelope.

20 42. The system of claim 41 further comprising means for determining size of the
virtualized sheet as a function of size of the envelope.

25 43. The system of claim 41 wherein the means for determining said printer offset
comprises means for sending a print job having one or more patterns to said printer and means
for determining said printer offset as a function of how said one or more patterns print on a test
envelope.

30 44. The system of claim 41 wherein the means for determining said printer offset
comprises:
means for selecting a printer;
means for determining the offset for said printer from a printer database having
information on one or more printer drivers.

35 45. The system of claim 41 further comprising means for rotating the image of said
postal indicia as a function of said printable region of said virtualized sheet.

 46. The system of claim 41 further comprising means for scaling a logo as a function
of said printable region of said virtualized sheet.

1 47. Computer-readable media embodying a program of instructions executable by a
computer to perform a method for printing postal indicia onto an envelope, the method
comprising:

5 determining a printer offset as a function of how the envelope is fed into said printer;
generating a print job for a virtualized sheet wherein an image of said postal indicia is
located within a printable region of the virtualized sheet as a function of said printer offset; and
printing said postal indicia onto said envelope.

10 48. The computer-readable media of claim 47 further comprising determining size of
the virtualized sheet as a function of size of the envelope.

15 49. The computer-readable media of claim 47 wherein the step of determining said
printer offset comprises sending a print job having one or more patterns to said printer and
determining said printer offset as a function of how said patterns print on a test envelope.

20 50. The computer-readable media of claim 47 wherein the step of determining said
printer offset comprises:

selecting a printer;

determining the offset for the selected printer from a printer database having information
on one or more printer drivers.

25 51. The computer-readable media of claim 47 wherein the step of printing said postal
indicia comprises printing a FIM.

30 52. The computer-readable media of claim 47 wherein the step of printing said postal
indicia comprises printing a human readable portion.

35 53. The computer-readable media of claim 52 wherein the step of printing said human
readable portion comprises printing a logo.

 54. The computer-readable media of claim 53 further comprising scaling the logo as
a function of said printable region of said virtualized sheet.

 55. The computer-readable media of claim 47 wherein the step of printing said postal
indicia comprises printing a two dimensional barcode portion.

 56. The computer-readable media of claim 47 further comprising rotating the image
of said envelope as a function of printable region of said virtualized sheet.

1 57. The computer-readable media of claim 56 further comprising translating an origin
of said virtualized sheet and rendering the image of said postal indicia as a function of said
translated origin.

5 58. The computer-readable media of claim 56 further comprising:
performing a first set of adjustments to a drawing surface;
rendering a first component of said graphic in accordance with the first set of adjustments
to said drawing surface;
10 storing location of a second component of said graphic in accordance with first set of
adjustment to said drawing surface;
performing a second set of adjustments to the drawing surface; and
rendering said second component of said graphic in accordance with the second set of
adjustments to the drawing surface.

FIG. 1

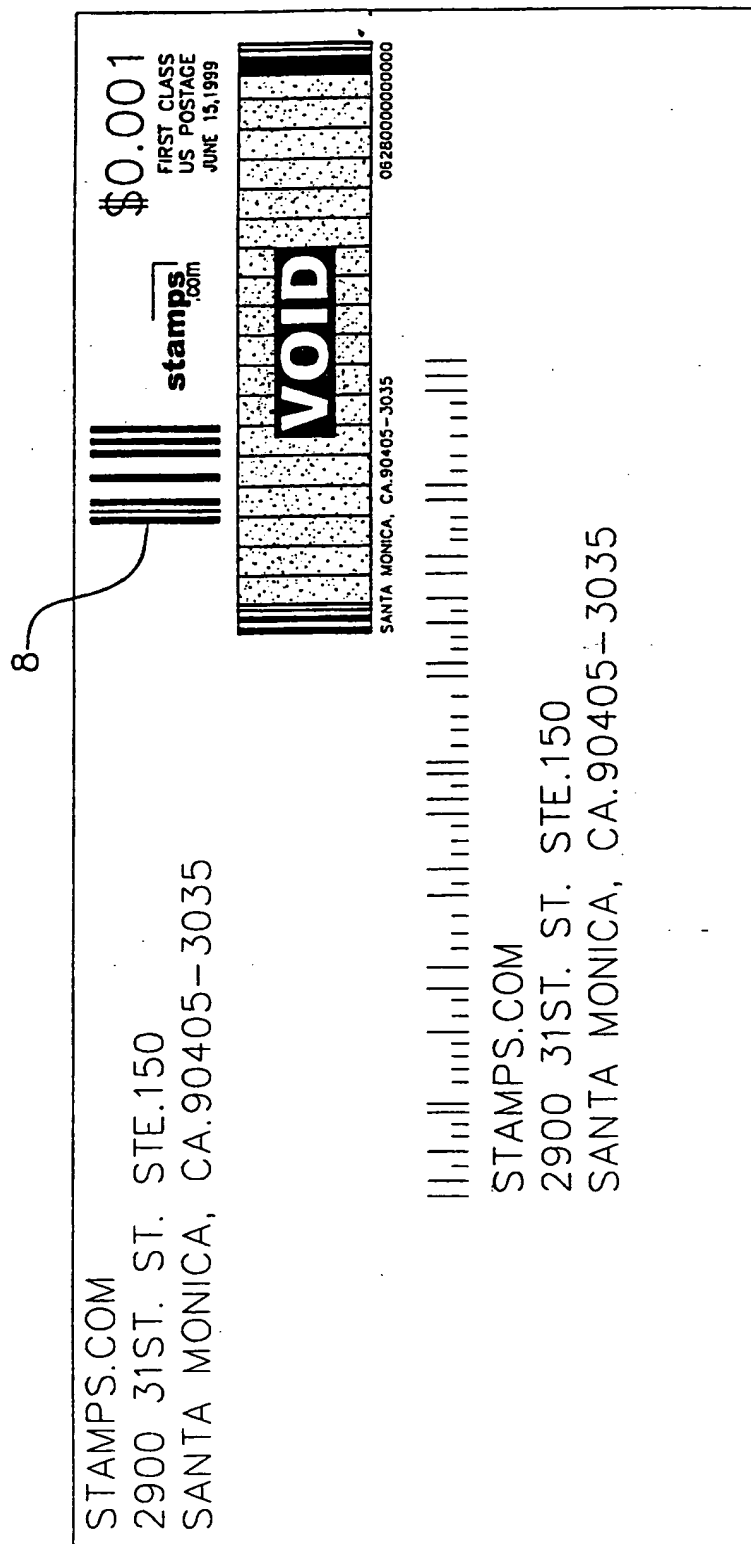


FIG. 2

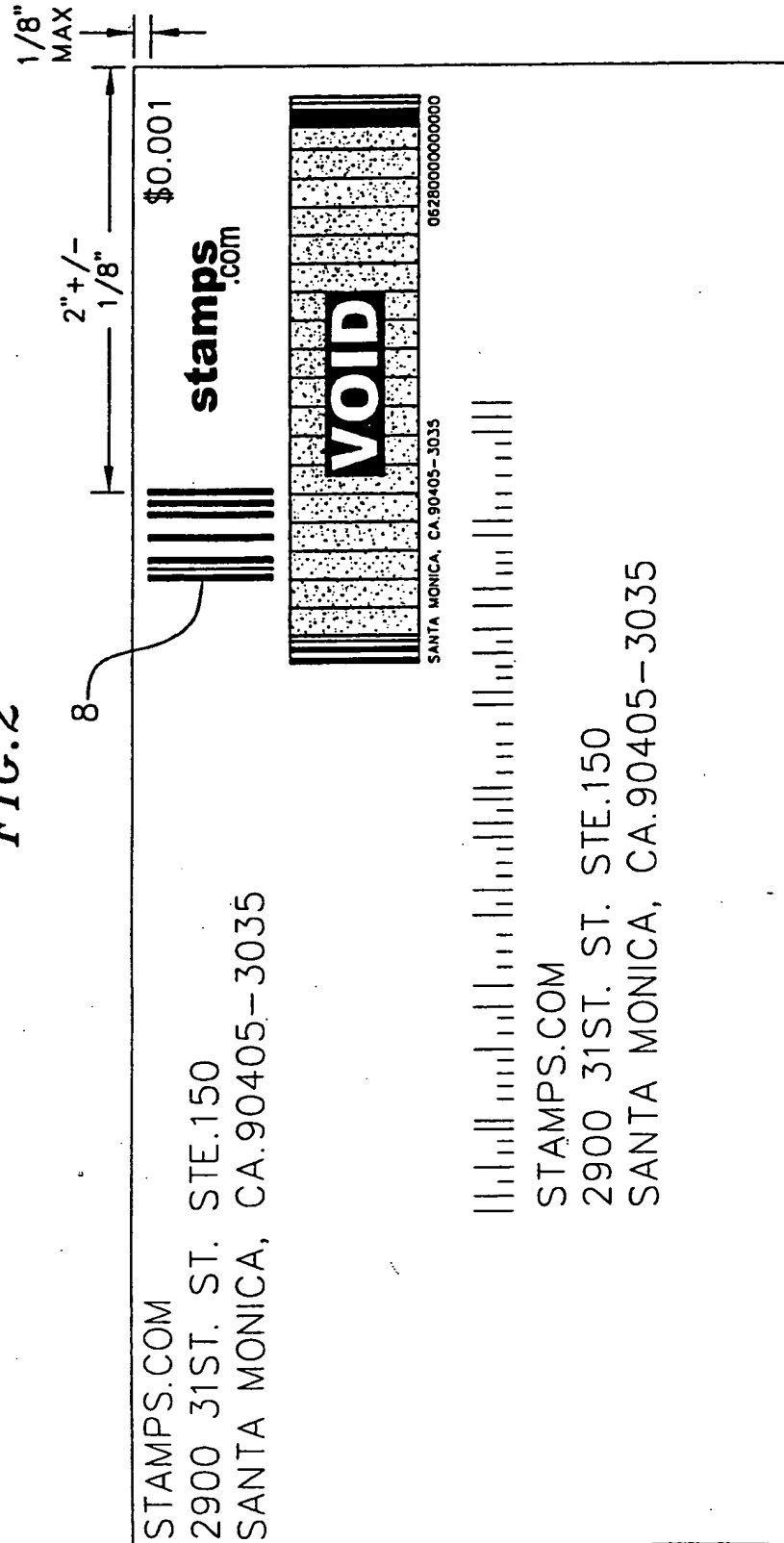


FIG. 3A

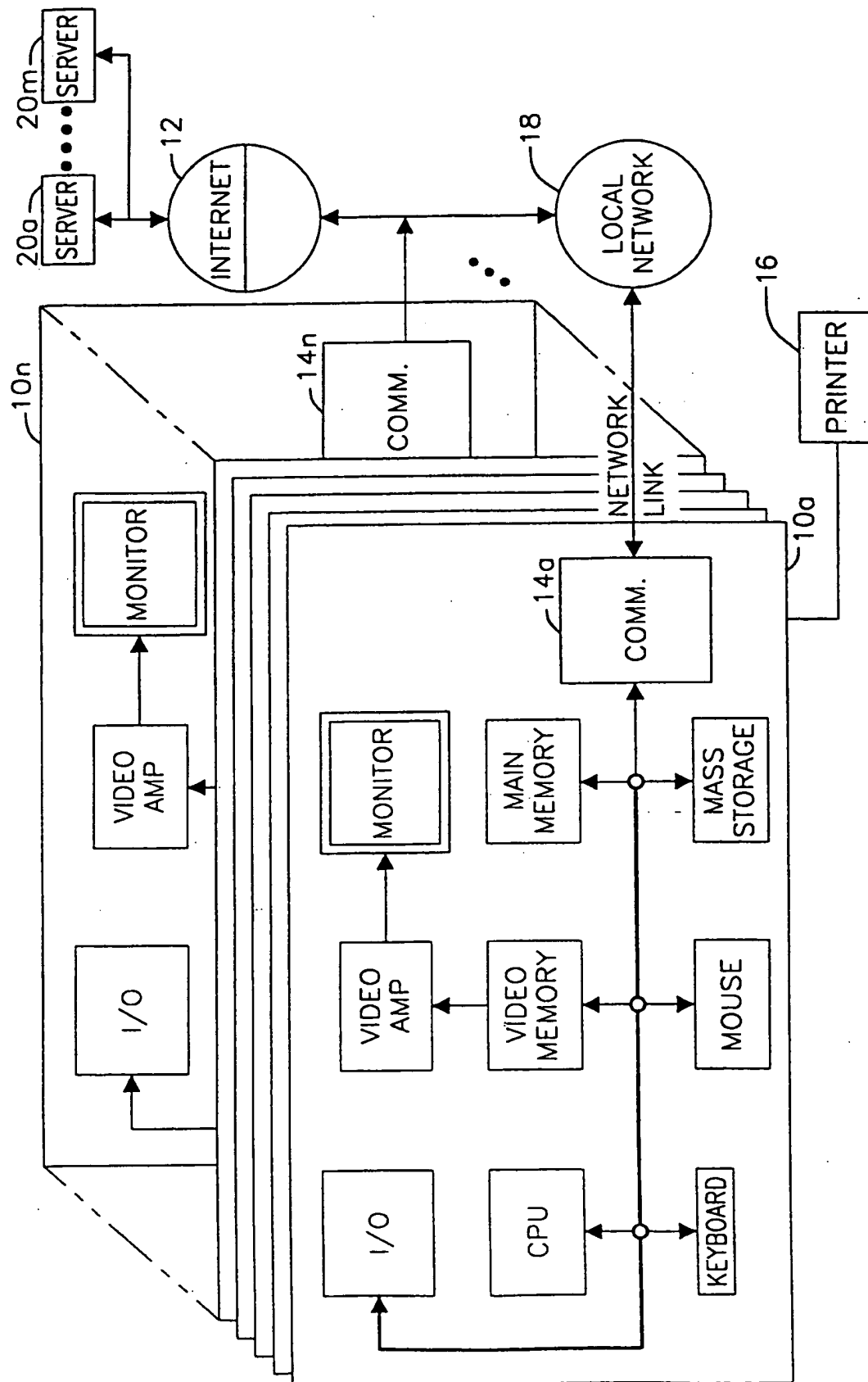
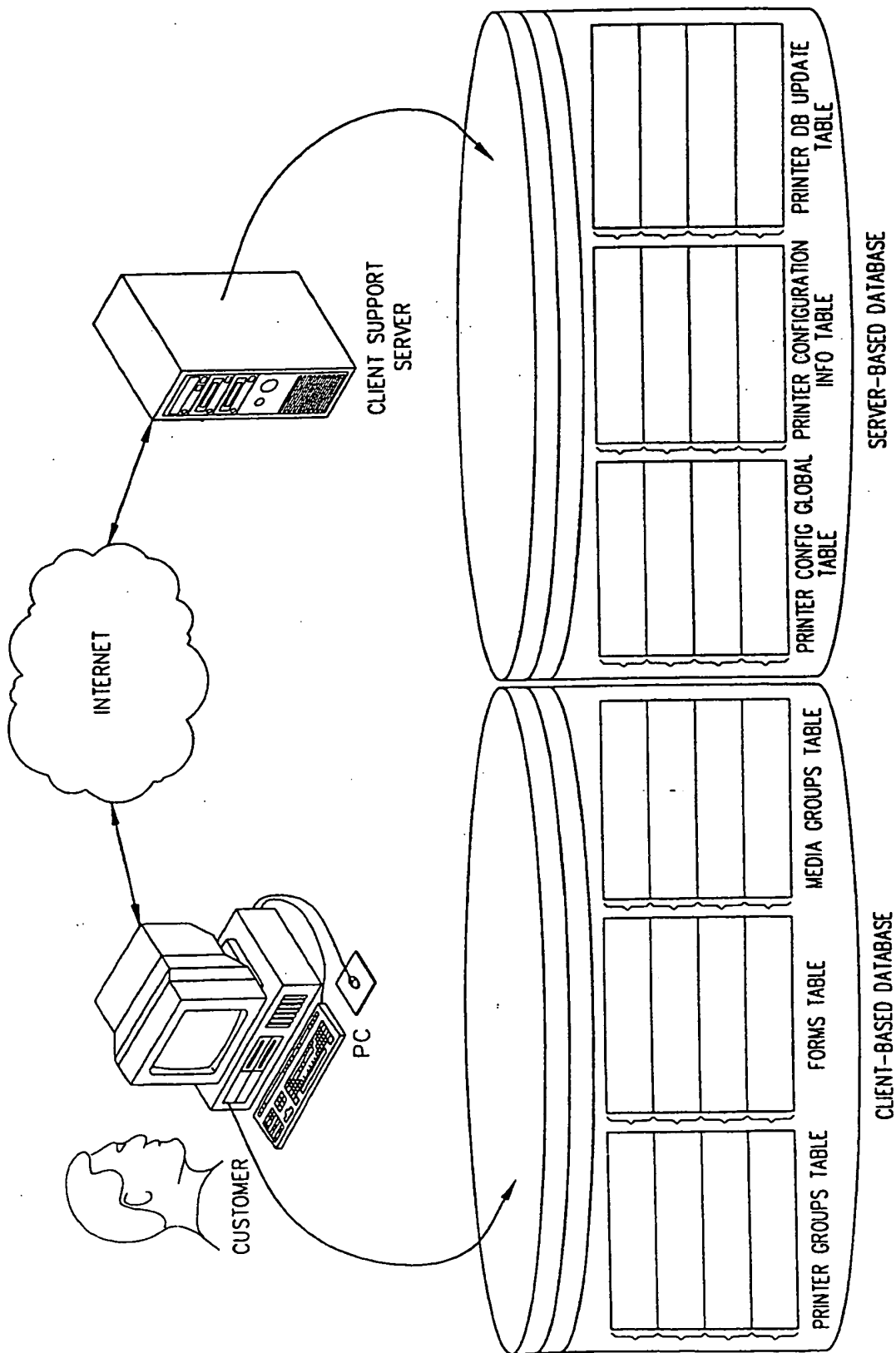


FIG. 3B

CLIENT-BASED AND SERVER-BASED DATABASES



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FIG. 4

PRINT POSTAGE

RETURN ADDRESS

REGISTERED USER'S NAME
ADDRESS
CITY, ST., ZIP +4

DELIVERY ADDRESS

RECIPIENT'S NAME
ADDRESS
CITY, ST., ZIP +4

ADDRESS BOOK

☐ DO NOT PRINT THE RETURN ADDRESS

MAIL PIECE INFORMATION

LETTER: TEXT DESCRIPTION OF
A LETTER TYPE OF MAIL PIECE TO
BE DETERMINED

PRINT ON: ENVELOPE - #10

ENTER WEIGHT: 0 LBS. 1 OZ. SCALE

SELECT A MAIL SERVICE: 28A

FIRST CLASS MAIL: \$0.33
PRIORITY MAIL: \$2.76
EXPRESS MAIL: \$9.95

AVAILABLE POSTAGE: \$

PREVIEW

STAMPS.COM
2900 31ST. ST. STE.150
SANTA MONICA, CA.90405-3035

VOID

STAMPS.COM
2900 31ST. ST. STE.150
SANTA MONICA, CA.90405-3035

PRINT

OPTIONS

CLOSE

HELP

FIG. 5

PRINT

?

×

PRINTER

NAME: EPSON STYLUS COLOR 600

PAPER FEED: AUTO SHEET FEEDER

STATUS: IDLE

TYPE: EPSON STYLUS COLOR 600

WHERE: LPT1

PROPERTIES

PLEASE INSERT THE ENVELOPE INTO THE PRINTER SHORT EDGE FIRST.

SHORT
EDGE

LONG
EDGE

THIS IS NECESSARY BECAUSE THE EPSON STYLUS COLOR 600 PRINTER CANNOT PRINT POSTAGE THAT CONFORMS TO USPS REGULATIONS WHEN ENVELOPES ARE INSERTED LONG EDGE FIRST.

YOU ARE PRINTING A SAMPLE ENVELOPE.

PRINT SAMPLE

PRINT INTERNET POSTAGE

CANCEL

37

35

36

SUBSTITUTE SHEET (RULE 26)

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FIG. 6

PRINT POSTAGE

RETURN ADDRESS

REGISTERED USER'S NAME
ADDRESS
CITY, ST., ZIP + 4

☐ DO NOT PRINT THE RETURN ADDRESS

MAIL PIECE INFORMATION

LETTER: TEXT DESCRIPTION OF A LETTER TYPE OF MAIL PIECE TO BE DETERMINED

PRINT ON: AVERY # 5643

ENTER WEIGHT: 9 LBS. 4 OZ. SCALE

SELECT A MAIL SERVICE:

FIRST CLASS MAIL: \$1.12
PRIORITY MAIL: \$4.73 TO \$5.31
EXPRESS MAIL: \$13.25 TO \$21.98

AVAILABLE POSTAGE: \$
COST OF MAILING: XX RECIPIENTS @ \$YY.YY=\$ZZZ.ZZ

DELIVERY ADDRESS

RECIPIENT'S NAME
RECIPIENT'S NAME
RECIPIENT'S NAME
RECIPIENT'S NAME
RECIPIENT'S NAME

\$4.73
\$4.89
\$5.09
\$5.31
\$5.31

ADDRESS BOOK

PREVIEW

STAMPS.COM
2800 31ST. ST. STE.150
SANTA MONICA, CA.90405-3035

VOID

STAMPS.COM
2800 31ST. ST. STE.150
SANTA MONICA, CA.90405-3035

PRINT

OPTIONS

CLOSE

HELP

SUBSTITUTE SHEET (RULE 26)

FIG. 7

ENVELOPE PRINTING OPTIONS

42 ☐ DO NOT PRINT A FACING IDENTIFICATION MARK

44 ☐ POSTDATE THE MAIL PIECE TO 05/04/99

46 ☐ INDICIUM CORRECTION

48 ☐ PRINT A POSTAGE CORRECTION

50 ☐ PRINT A DATE CORRECTION

52 RETURN ADDRESS

54 DELIVERY ADDRESS

56 INDICIUM GRAPHIC

80 RETURN ADDRESS GRAPHIC

82 INCLUDE GRAPHIC

88 OK

90 CANCEL

92 HELP

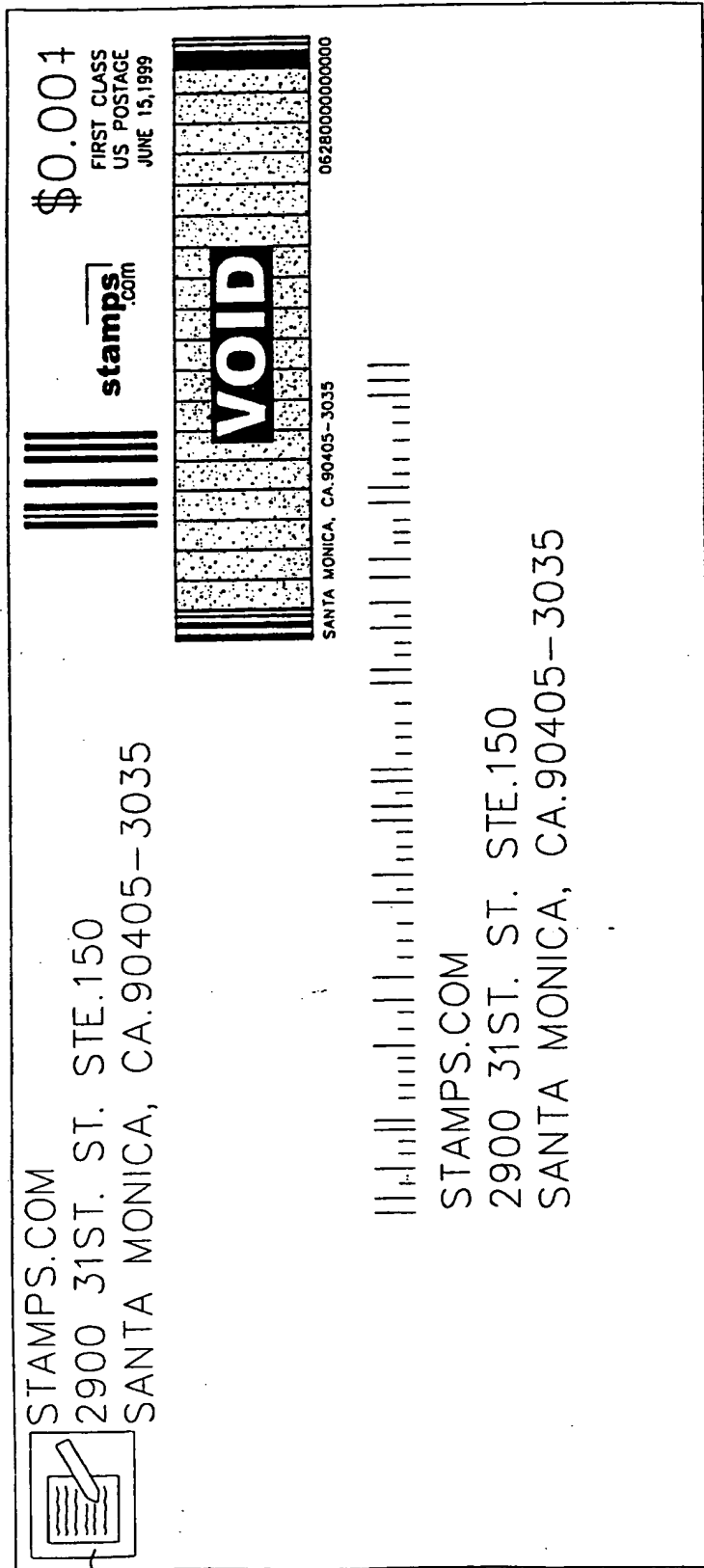
Font selection buttons: FONT, LEFT MARGIN, TOP MARGIN (for both RETURN and DELIVERY ADDRESS)

Graphic selection buttons: BROWSE (for both RETURN ADDRESS GRAPHIC and INDICIUM GRAPHIC)

Include checkboxes: INCLUDE GRAPHIC (for both RETURN ADDRESS GRAPHIC and INDICIUM GRAPHIC)

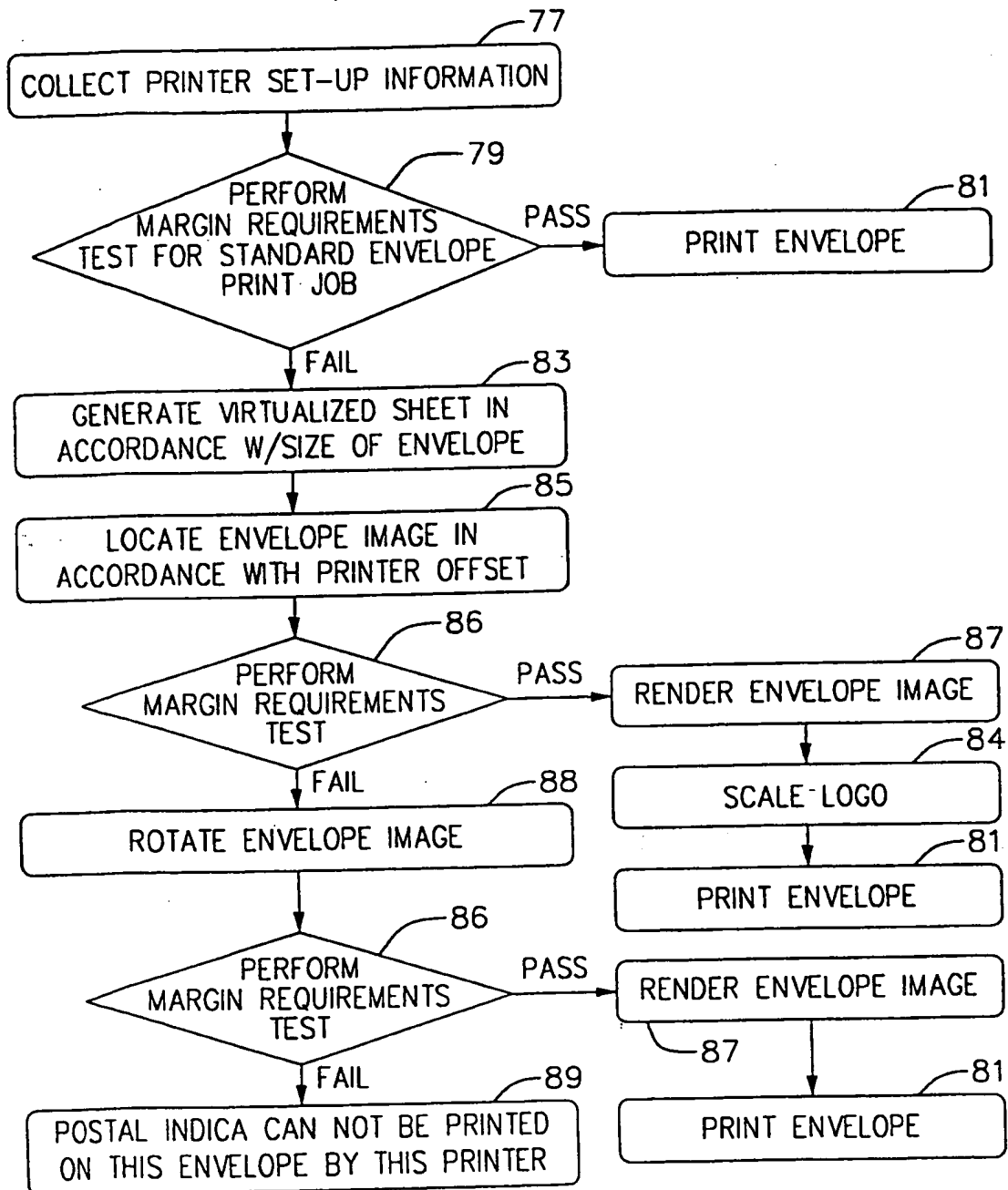
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FIG. 8



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FIG. 9



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FIG. 10

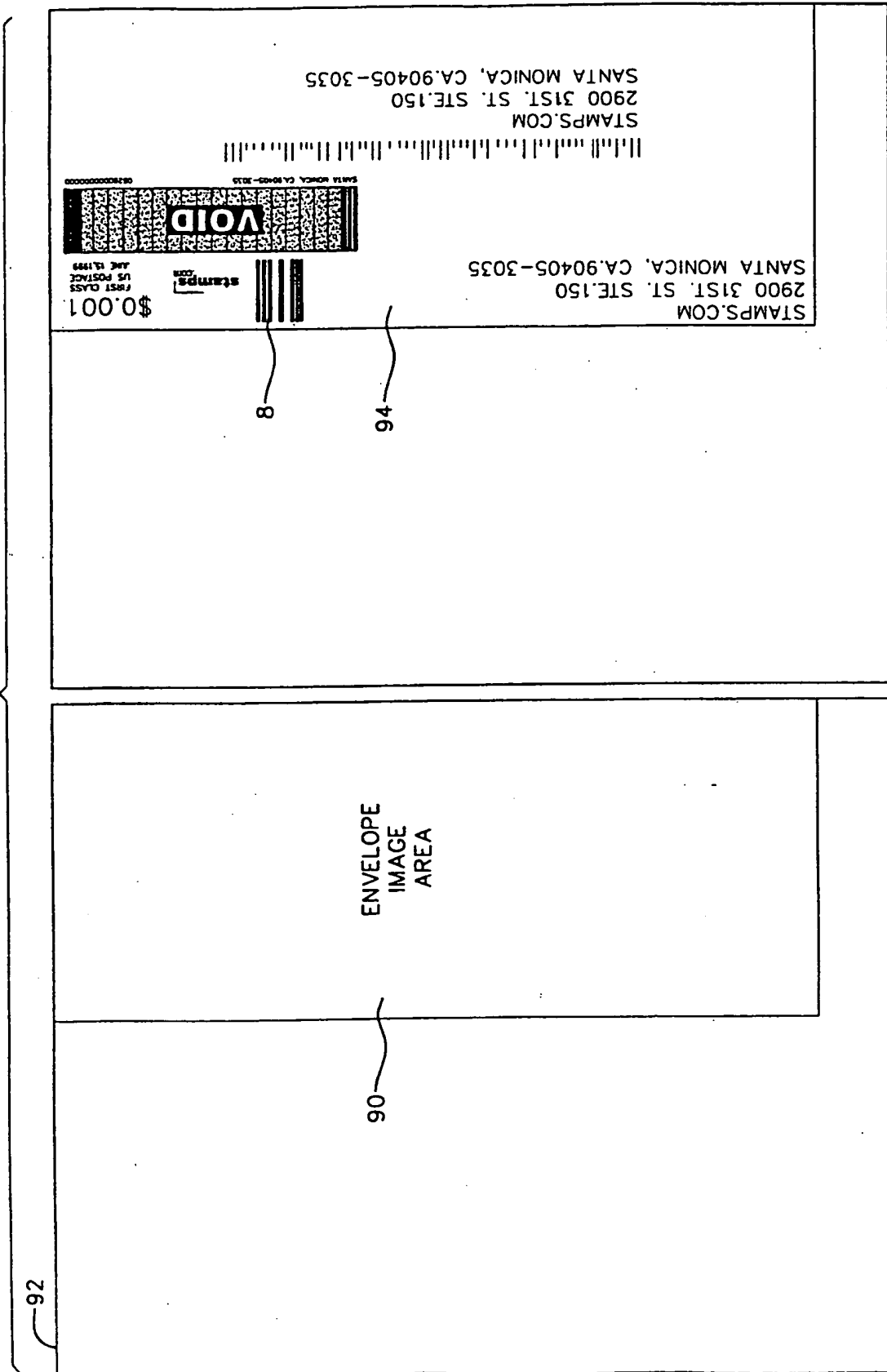


FIG. 11

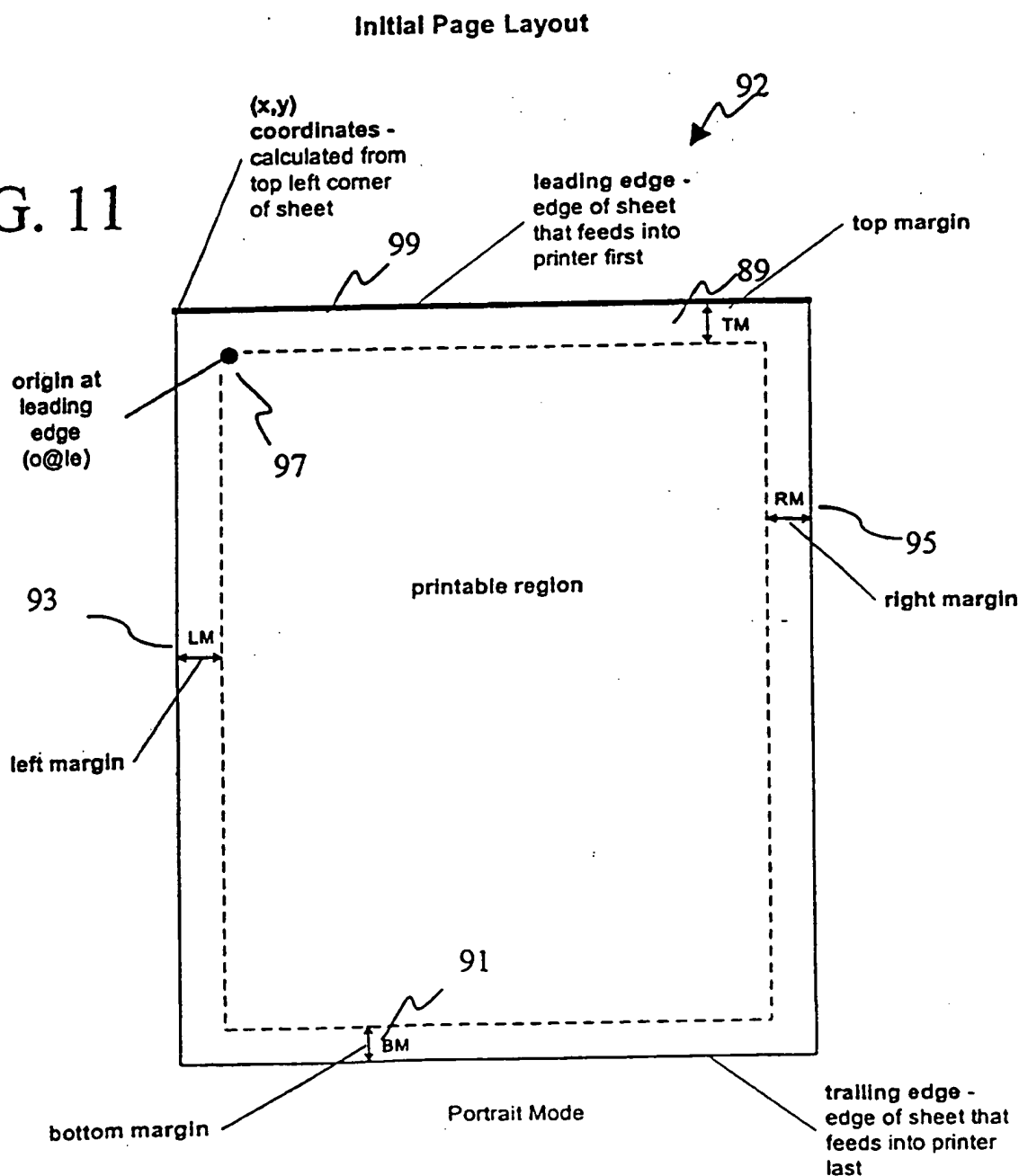


FIG. 12

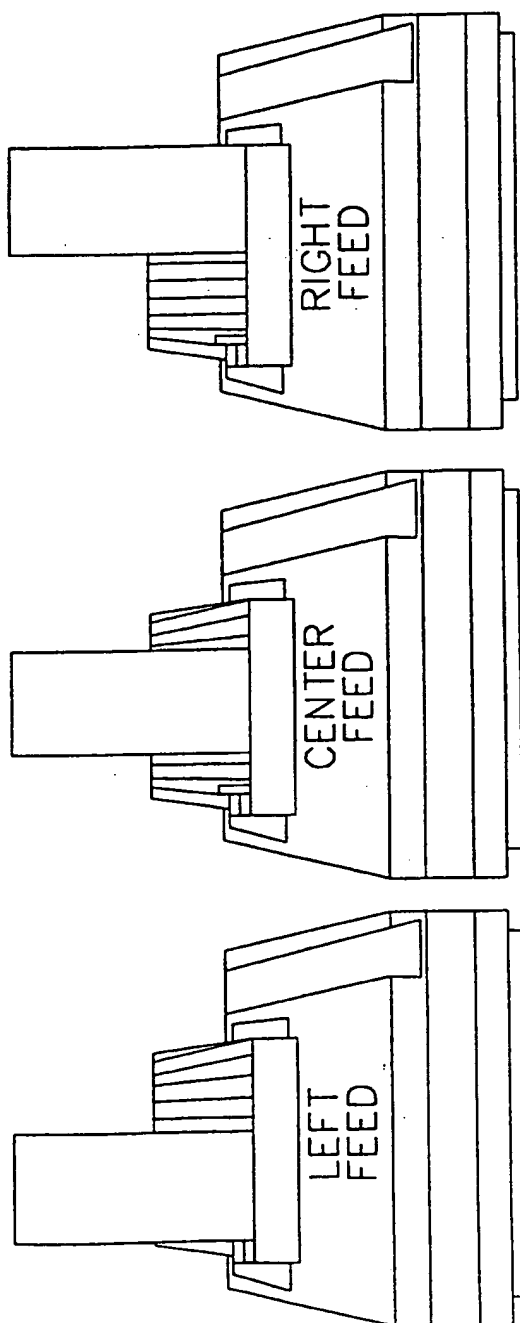
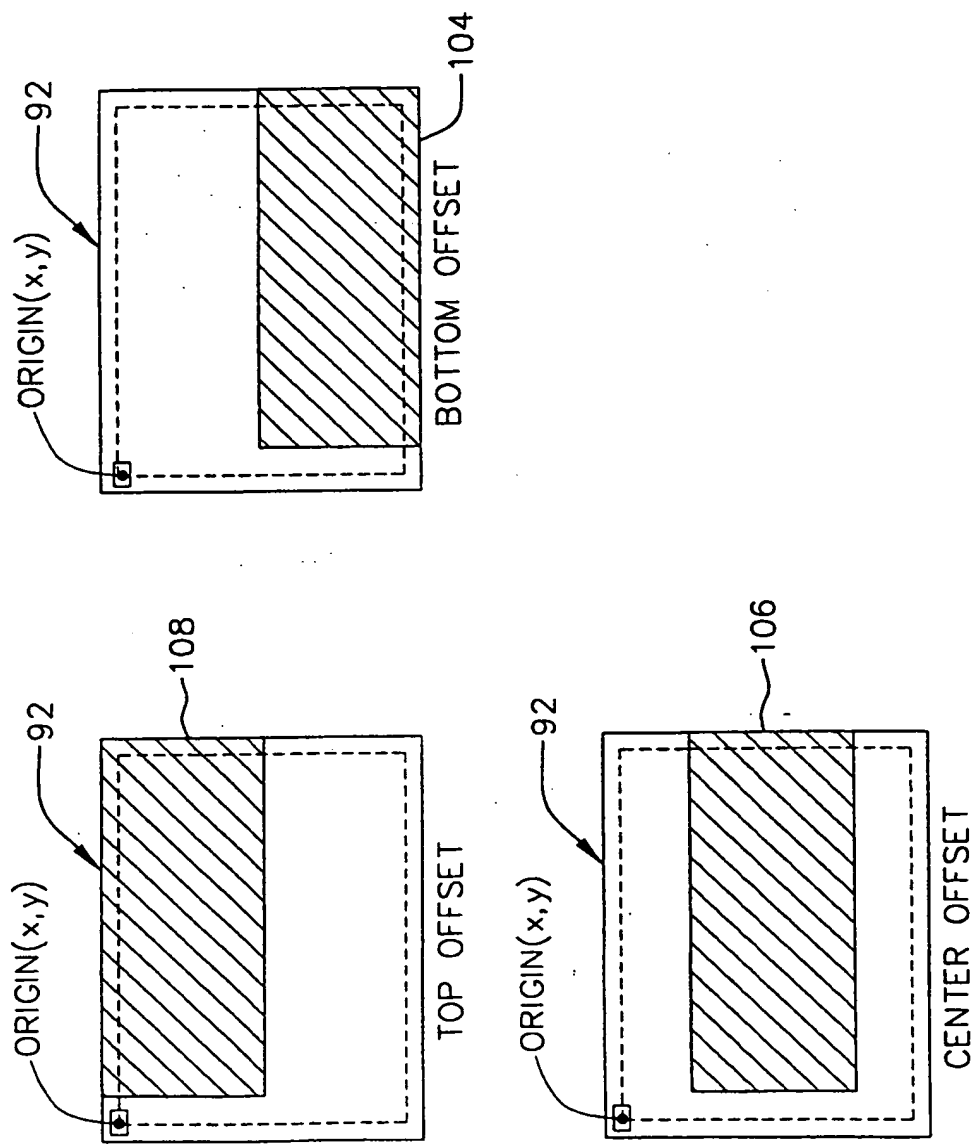


FIG. 13



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FIG. 14A

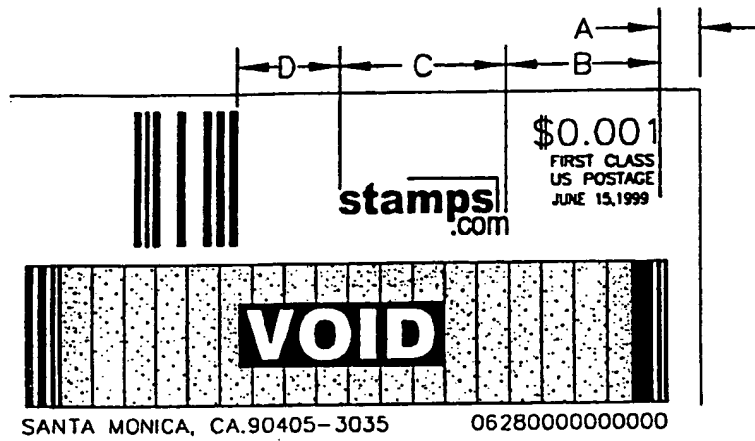


FIG. 14B

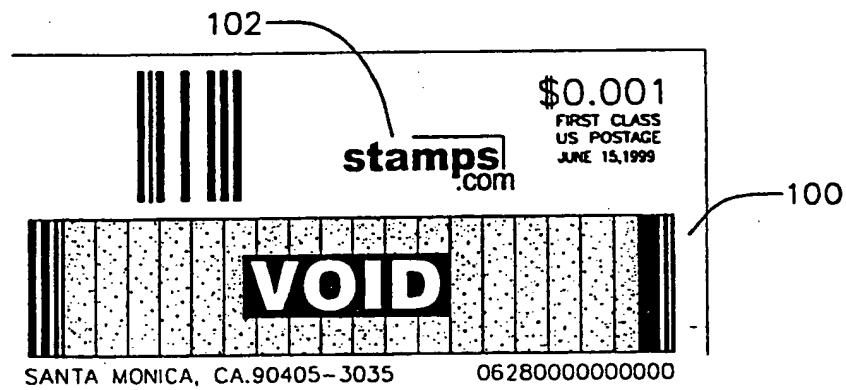
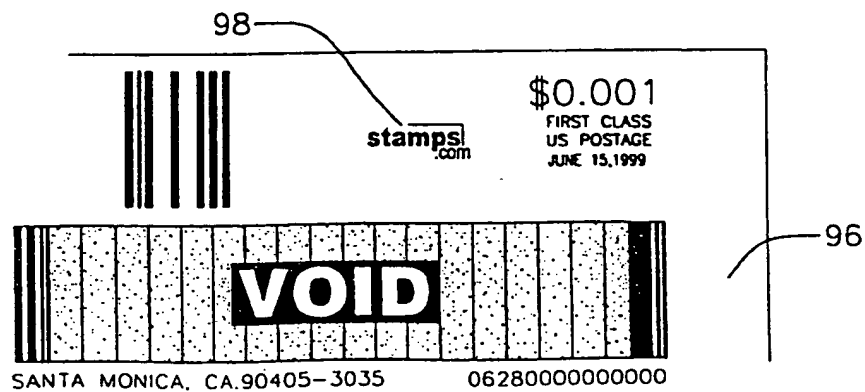


FIG. 14C



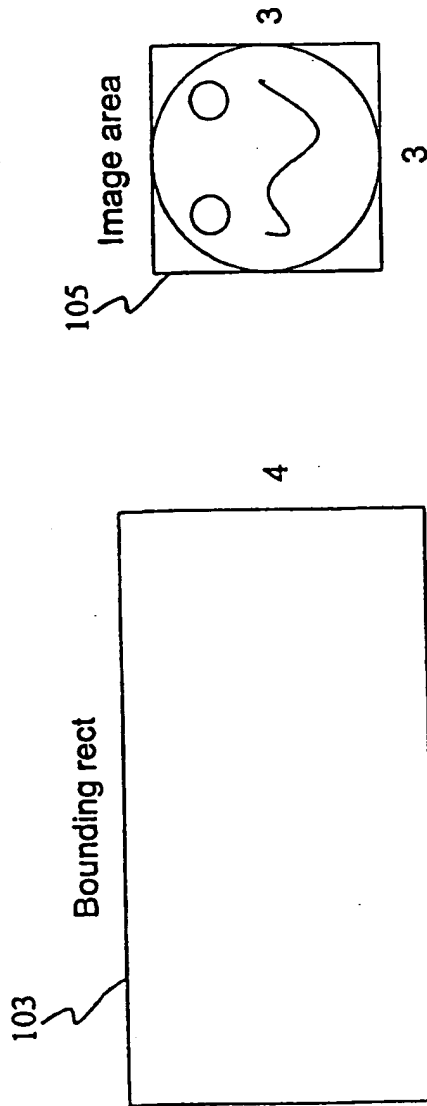


FIG. 15

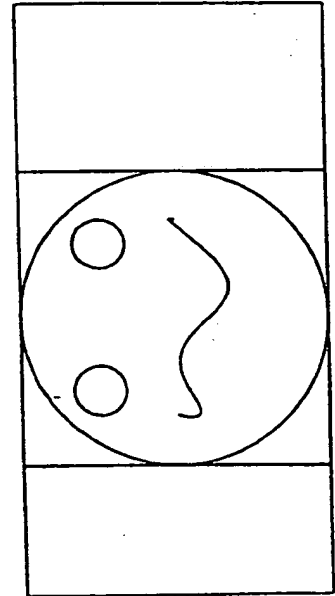
8

Bounding rect aspect ratio $\rightarrow 8 / 4 = 2$

Image area aspect ratio $\rightarrow 3 / 3 = 1$

Scaling factor $= 4 / 3$

New image area: height = 4, width = 4



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FIG. 16A

MARGINS

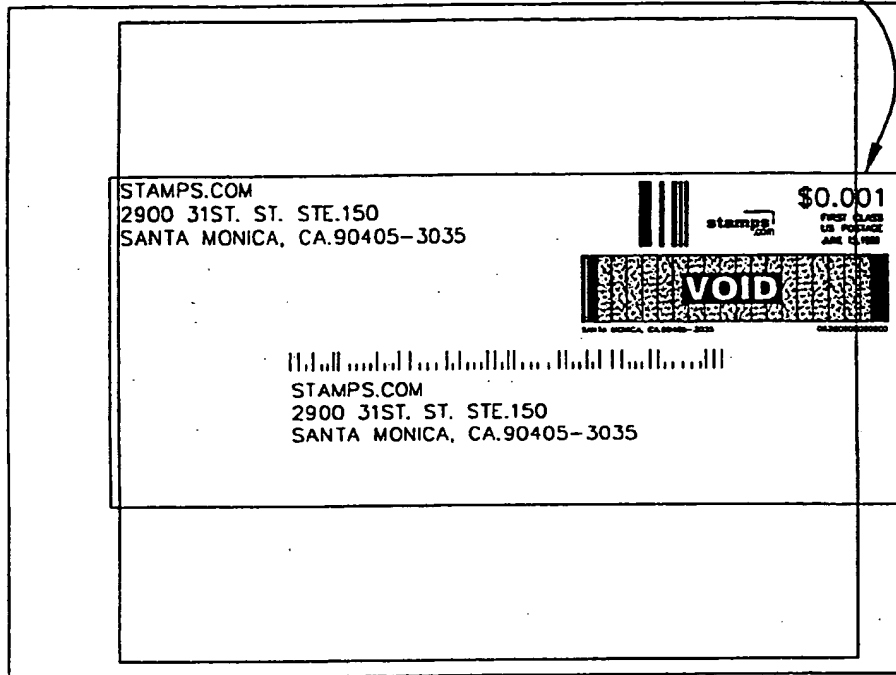
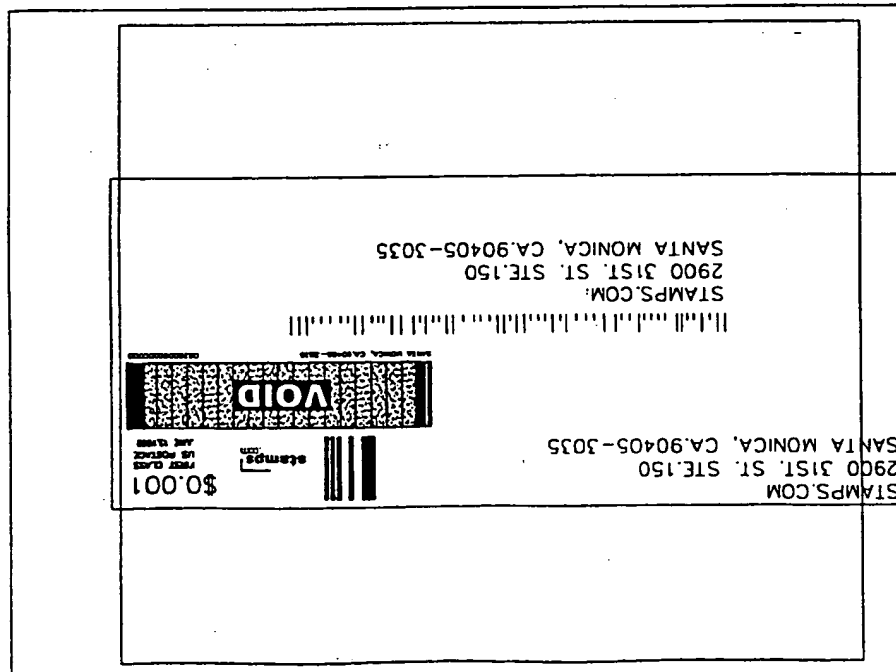
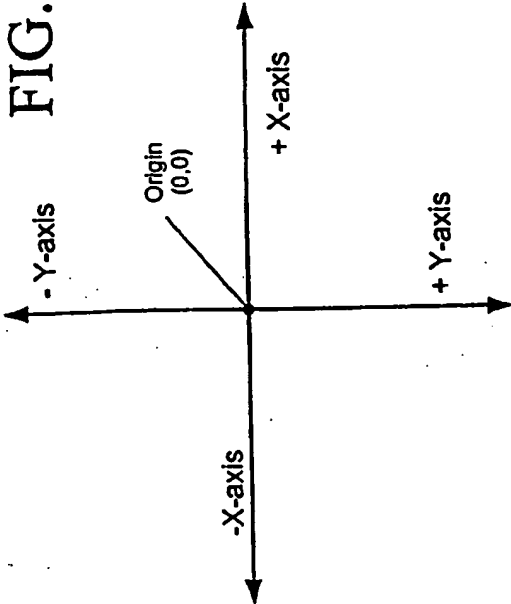


FIG. 16B

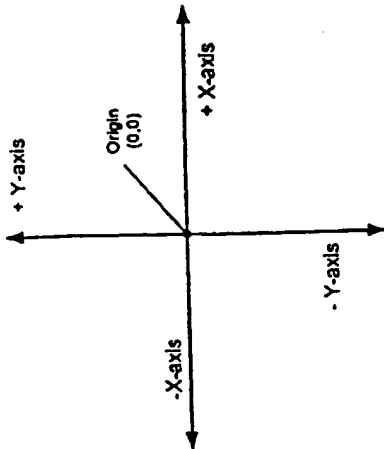


Normalized axes without rotation

FIG. 17B



Traditional Coordinate area



Normalized axes with rotation

FIG. 17C

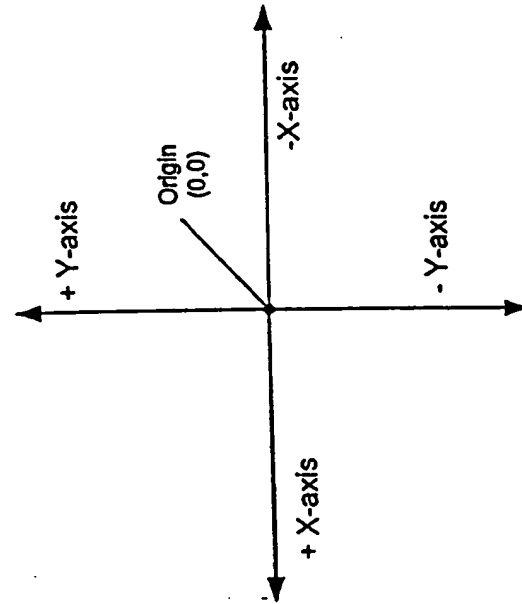
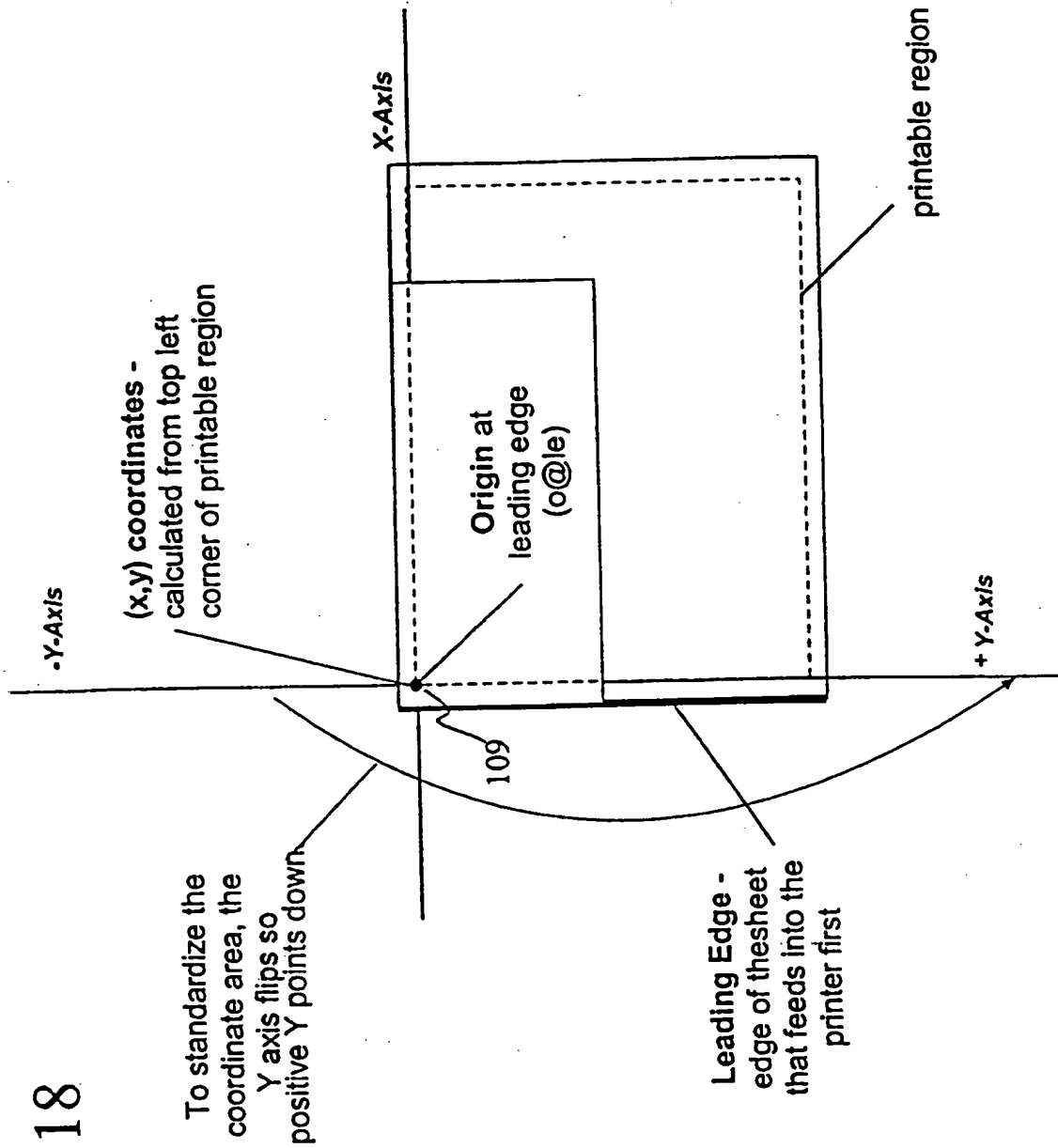


FIG. 17A

Origin with no envelope image rotation (EIR)

FIG. 18



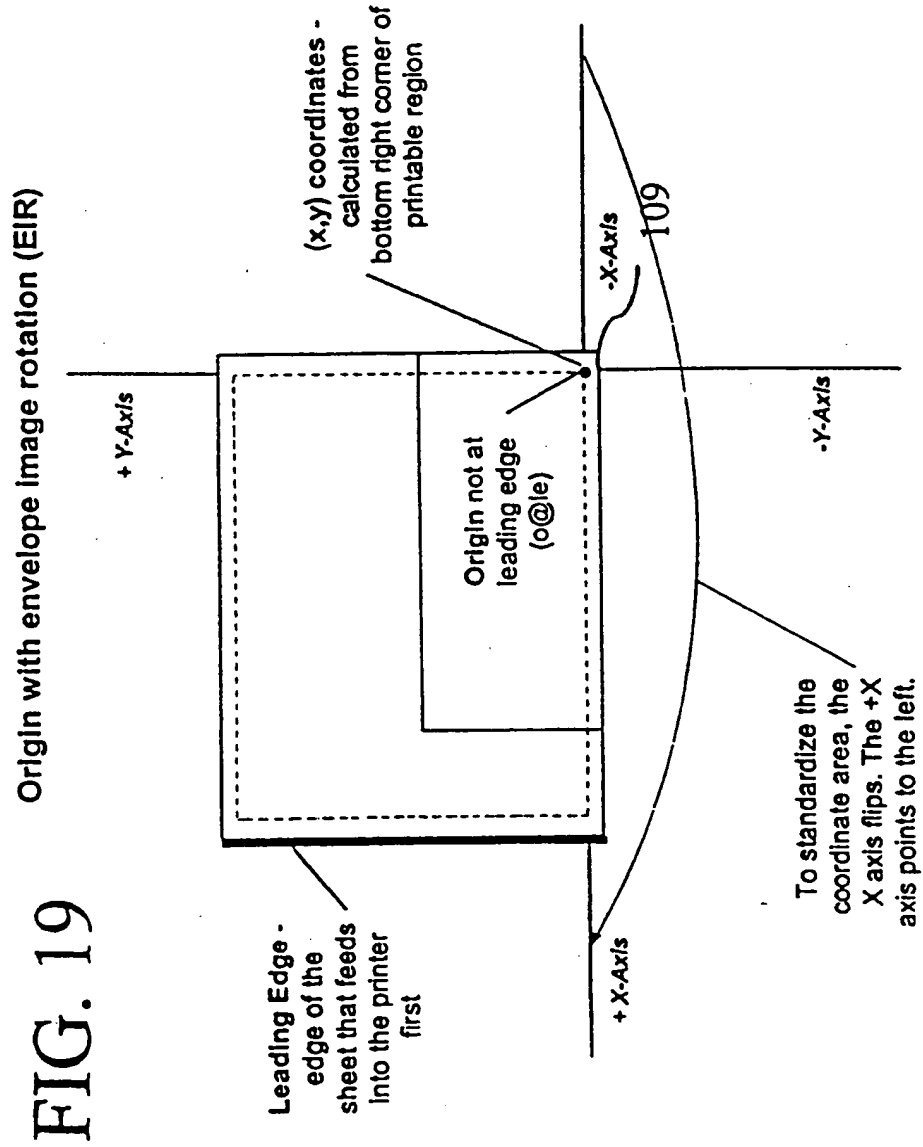
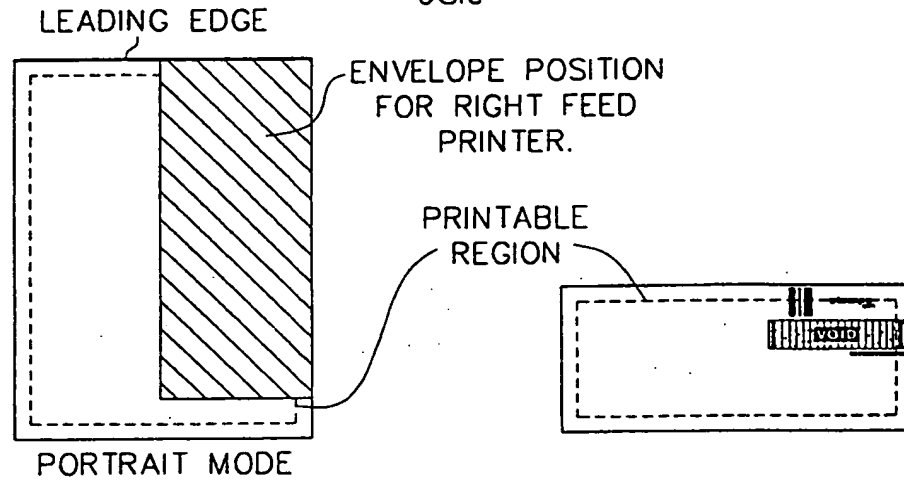
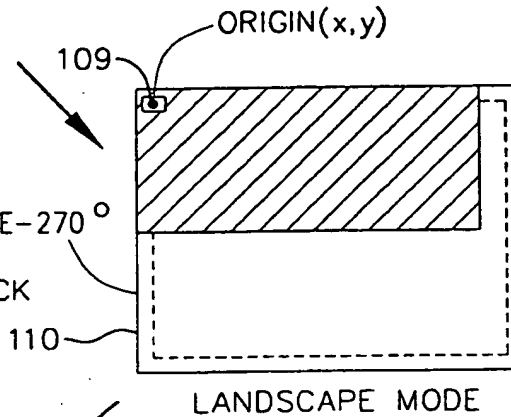


FIG.20A

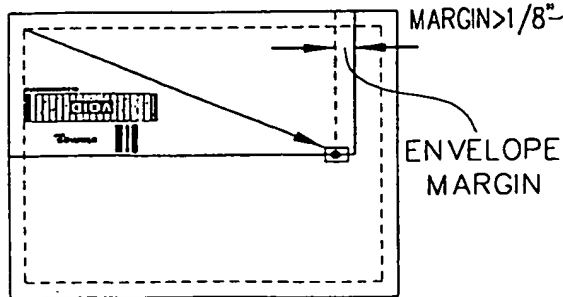
VIRTUALIZATION PROCESS
FOR RIGHT-FEED PRINTERS
o@le

**FIG.20B**

1. LANDSCAPE MODE - 270°
2. o@le
3. MARGIN CHECK

**FIG.20C**

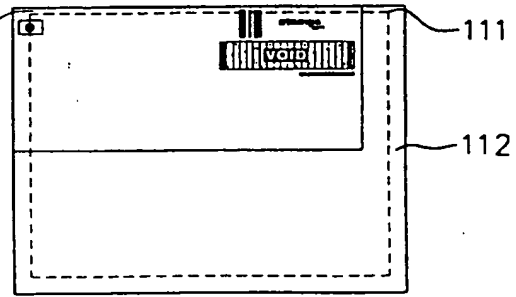
WITH IMAGE ROTATION



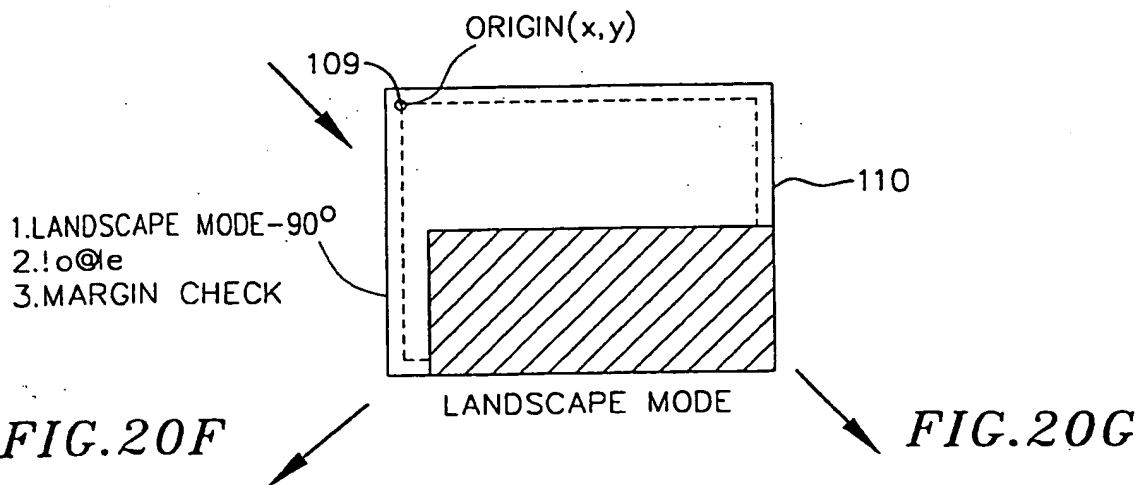
4. MARGIN CHECK FAILED
5. IMAGE ROTATION REQUIRED
6. ORIGIN SHIFTS DIAGONALLY

FIG.20D

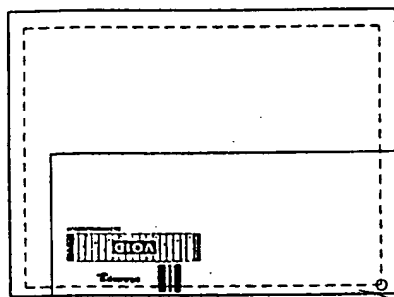
THIS ENVELOPE SATISFIES THE FIM
REQUIREMENTS WITH NO IMAGE ROTATION.



4. MARGIN CHECK PASSED
5. NO IMAGE ROTATION REQUIRED
6. NO ORIGIN SHIFTS REQUIRED

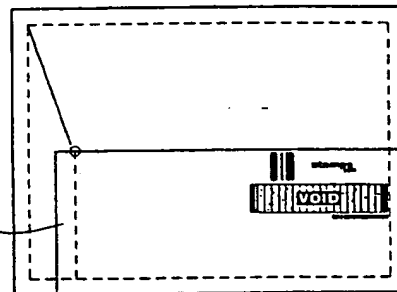
FIG. 20E

WITH IMAGE ROTATION

ENVELOPE
MARGIN

MARGIN > 1/8"

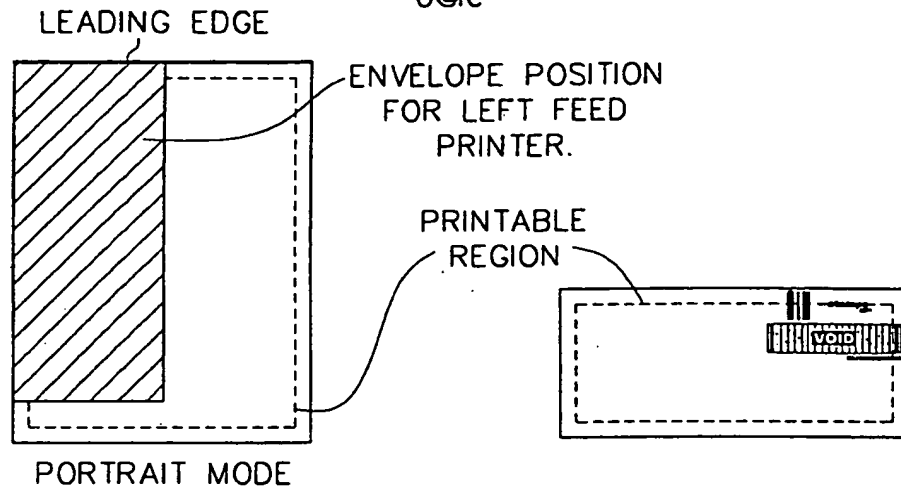
4. MARGIN CHECK FAILED
5. IMAGE ROTATION REQUIRED
6. ORIGIN SHIFTS DIAGONALLY

THIS ENVELOPE SATISFIES THE FIM
REQUIREMENTS WITH NO IMAGE ROTATION.

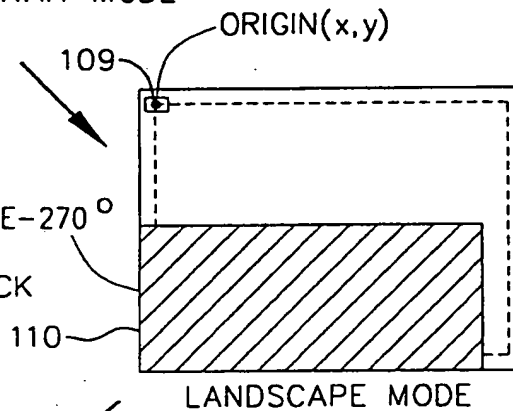
4. MARGIN CHECK PASSED
5. NO IMAGE ROTATION REQUIRED
6. NO ORIGIN SHIFTS DIAGONALLY

FIG. 21A

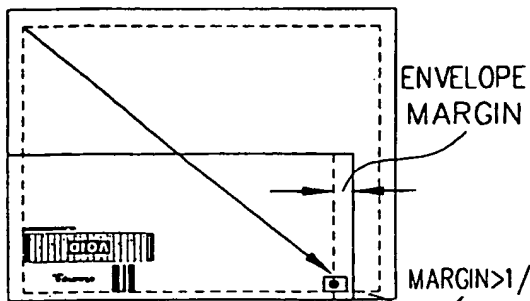
VIRTUALIZATION PROCESS
FOR LEFT-FEED PRINTERS
o@le

**FIG. 21B**

1. LANDSCAPE MODE - 270°
2. o@le
3. MARGIN CHECK

**FIG. 21C**

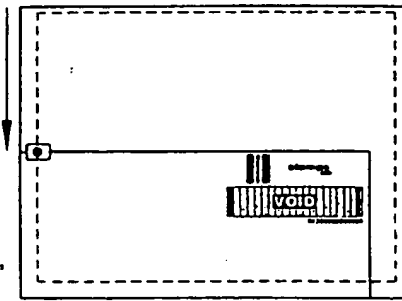
WITH IMAGE ROTATION



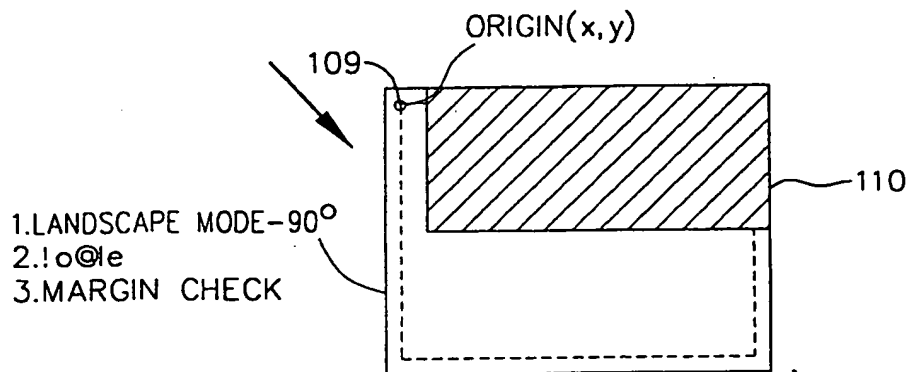
4. MARGIN CHECK FAILED
5. IMAGE ROTATION REQUIRED
6. ORIGIN SHIFTS DIAGONALLY

FIG. 21D

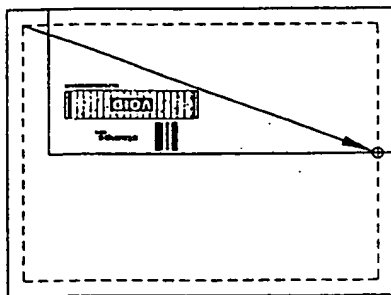
THIS ENVELOPE SATISFIES THE FIM
REQUIREMENTS WITH NO IMAGE ROTATION.



4. MARGIN CHECK PASSED
5. NO IMAGE ROTATION REQUIRED
6. NO ORIGIN SHIFTS REQUIRED

FIG. 21E*FIG. 21F*

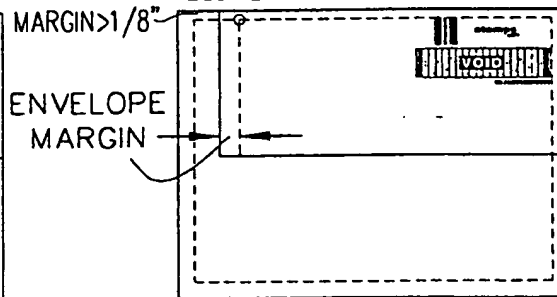
WITH IMAGE ROTATION



4. MARGIN CHECK FAILED
5. IMAGE ROTATION REQUIRED
6. ORIGIN SHIFTS DIAGONALLY

FIG. 21G

THIS ENVELOPE SATISFIES THE FIM REQUIREMENTS WITH NO IMAGE ROTATION.



4. MARGIN CHECK PASSED
5. NO IMAGE ROTATION REQUIRED
6. ORIGIN SHIFTS ACROSS

FIG.22A VIRTUALIZATION PROCESS
FOR CENTER-FEED PRINTERS

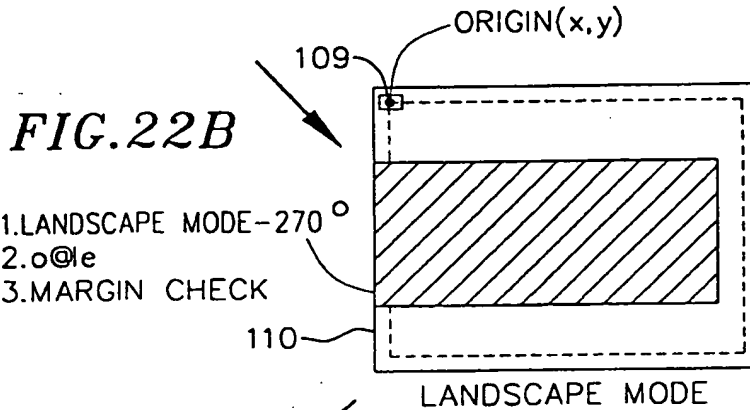
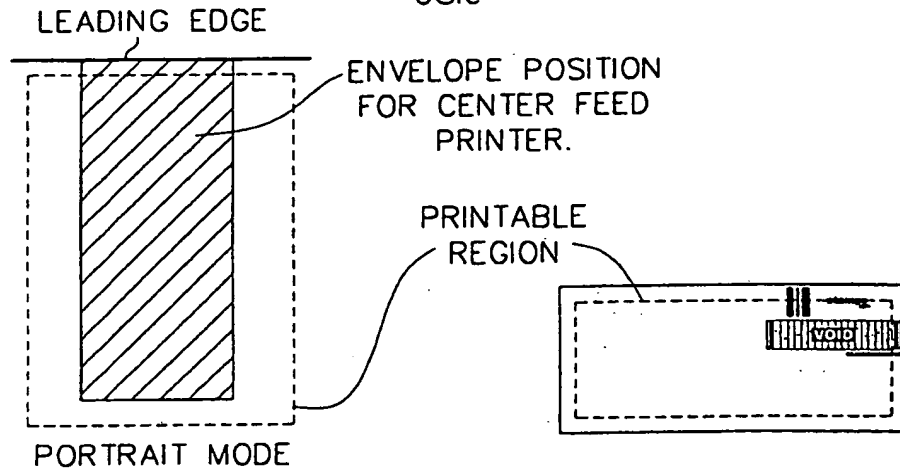
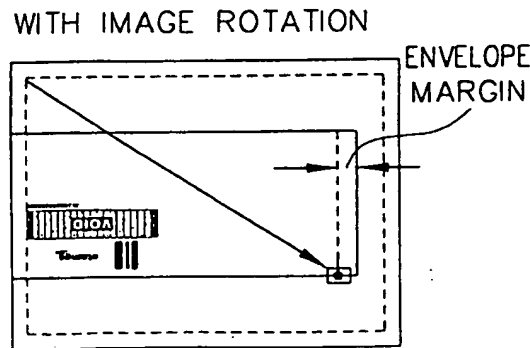


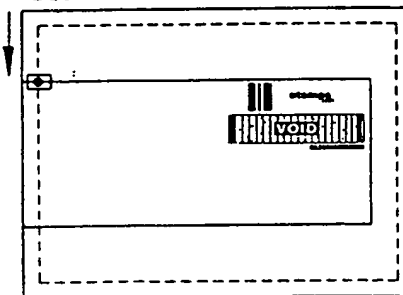
FIG.22C



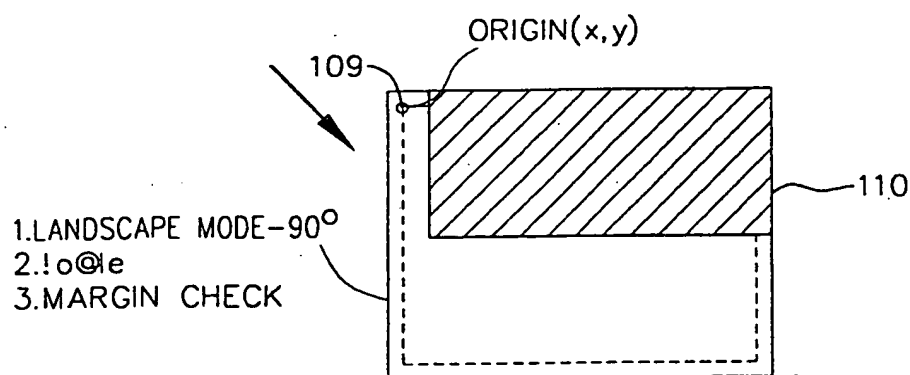
4.IMAGE ROTATION REQUIRED
5.ORIGIN SHIFTS DOWNWARD

FIG.22D

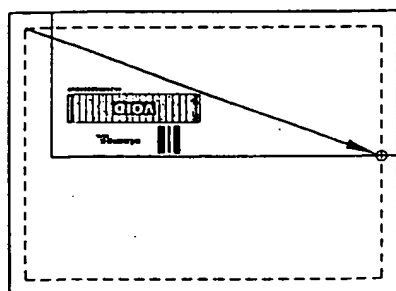
THIS ENVELOPE SATISFIES THE FIM REQUIREMENTS WITH NO IMAGE ROTATION.



4.NO IMAGE ROTATION REQUIRED
5.ORIGIN SHIFTS DOWNWARD

FIG. 22E*FIG. 22F*

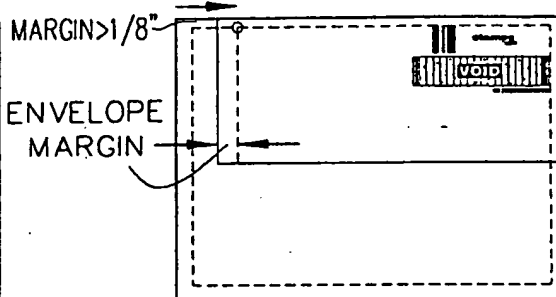
WITH IMAGE ROTATION



4. MARGIN CHECK FAILED
5. IMAGE ROTATION REQUIRED
6. ORIGIN SHIFTS DIAGONALLY

FIG. 22G

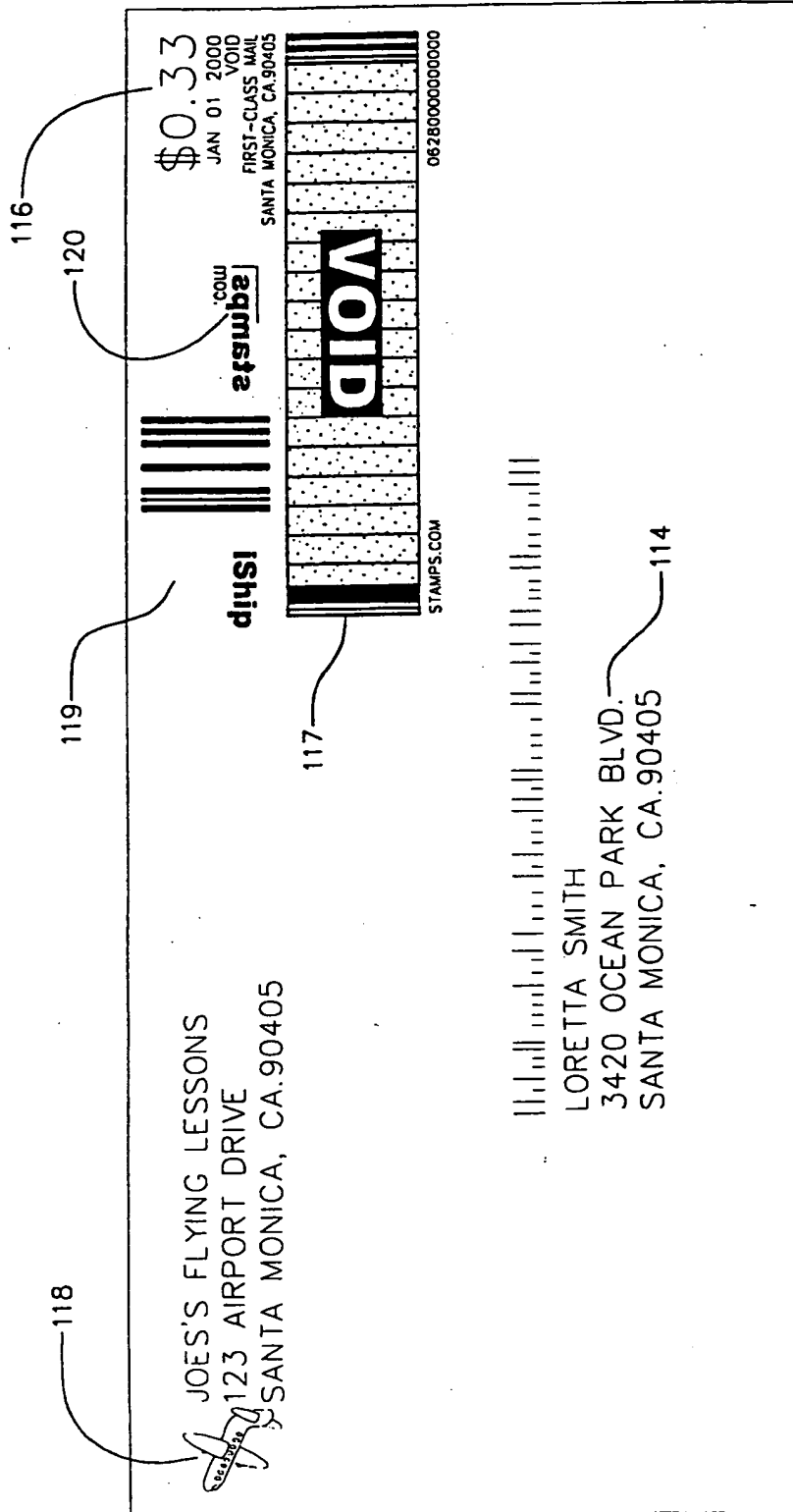
THIS ENVELOPE SATISFIES THE FIM REQUIREMENTS WITH NO IMAGE ROTATION.



4. MARGIN CHECK PASSED
5. NO IMAGE ROTATION REQUIRED
6. ORIGIN SHIFTS ACROSS

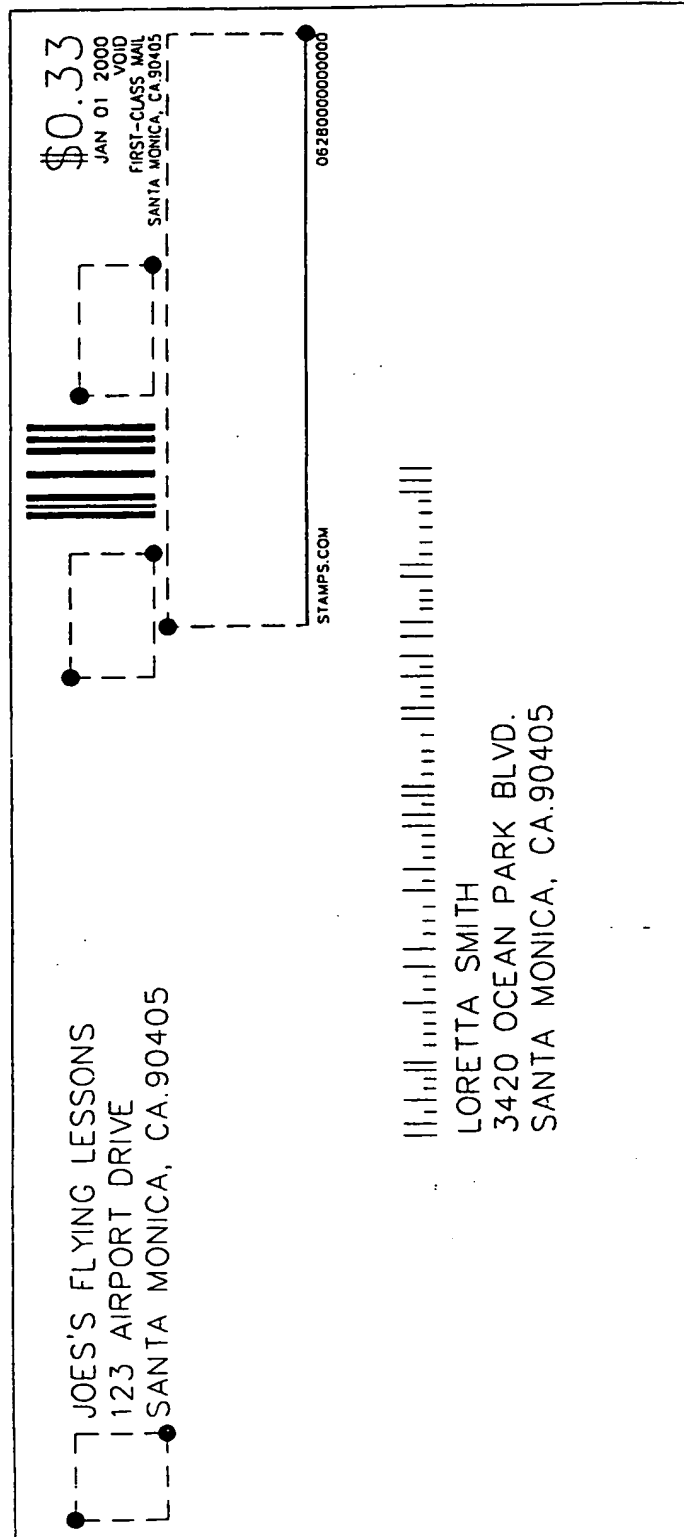
27/39

FIG. 23



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FIG. 24



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FIG. 25

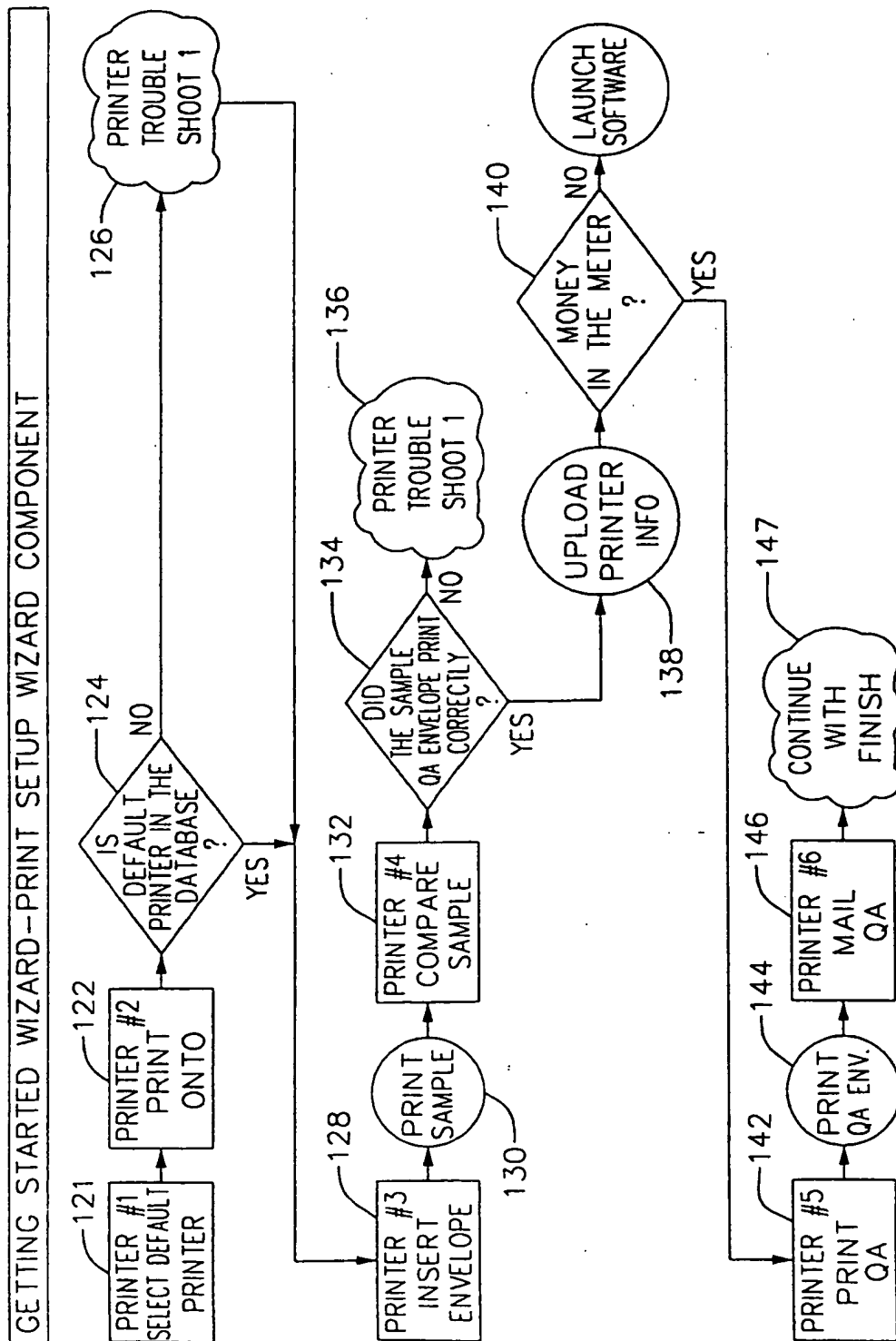


FIG.26

PRINTER #1 SELECT DEFAULT PRINTER

121

stamps.com

1. START
2. REGISTER WITH STAMPS.COM
3. APPLY FOR A POSTAL METER
4. TEST PRINTER
5. FINISH

PRINTER BANNER GRAPHIC

PLEASE SELECT A DEFAULT PRINTER TO BE USED FOR PRINTING POSTAGE.

DEFAULT PRINTER: 155

IN ORDER TO ENSURE THAT THE SELECTED PRINTER IS ABLE TO PRINT IN ACCORDANCE WITH USPS REQUIREMENTS, WE WILL NEED TO PRINT ONE OR MORE SAMPLE PIECES OF POSTAGE AS WELL AS A REAL PIECE OF POSTAGE.

SELECT "NEXT" TO CONTINUE.

<BACK NEXT> CANCEL

FIG.27

PRINTER #2 PRINT ONTO

156 122

stamps.com

1. START
2. REGISTER WITH STAMPS.COM
3. APPLY FOR A POSTAL METER
4. TEST PRINTER
5. FINISH

PRINTER BANNER GRAPHIC

SELECT THE SIZE OF THE ENVELOPES THAT THE POSTAGE WILL BE PRINTED ONTO.

PRINT ONTO: 157

WOULD YOU LIKE THE RETURN ADDRESS TO BE PRINTED ON THESE ENVELOPES? (SELECT NO IF YOU ARE USING ENVELOPES WITH A PREPRINTED RETURN ADDRESS)

☒ YES 158
☐ NO 159

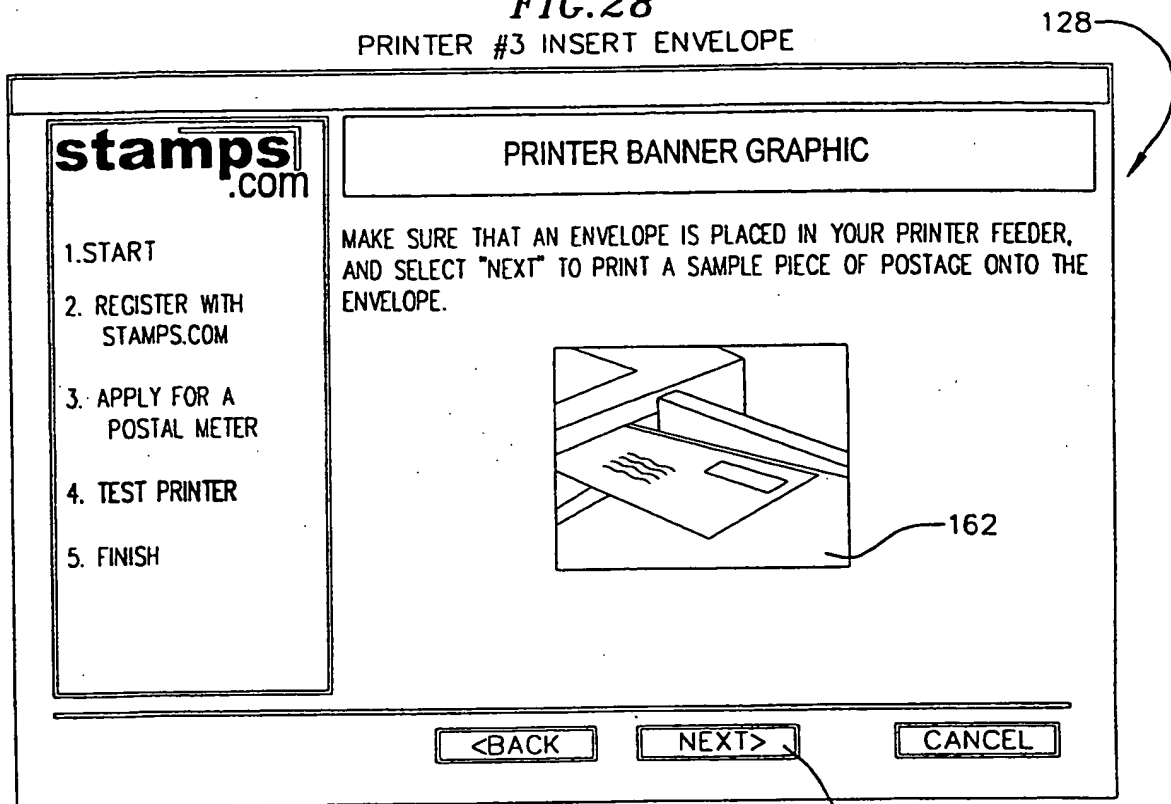
<BACK NEXT> CANCEL

160

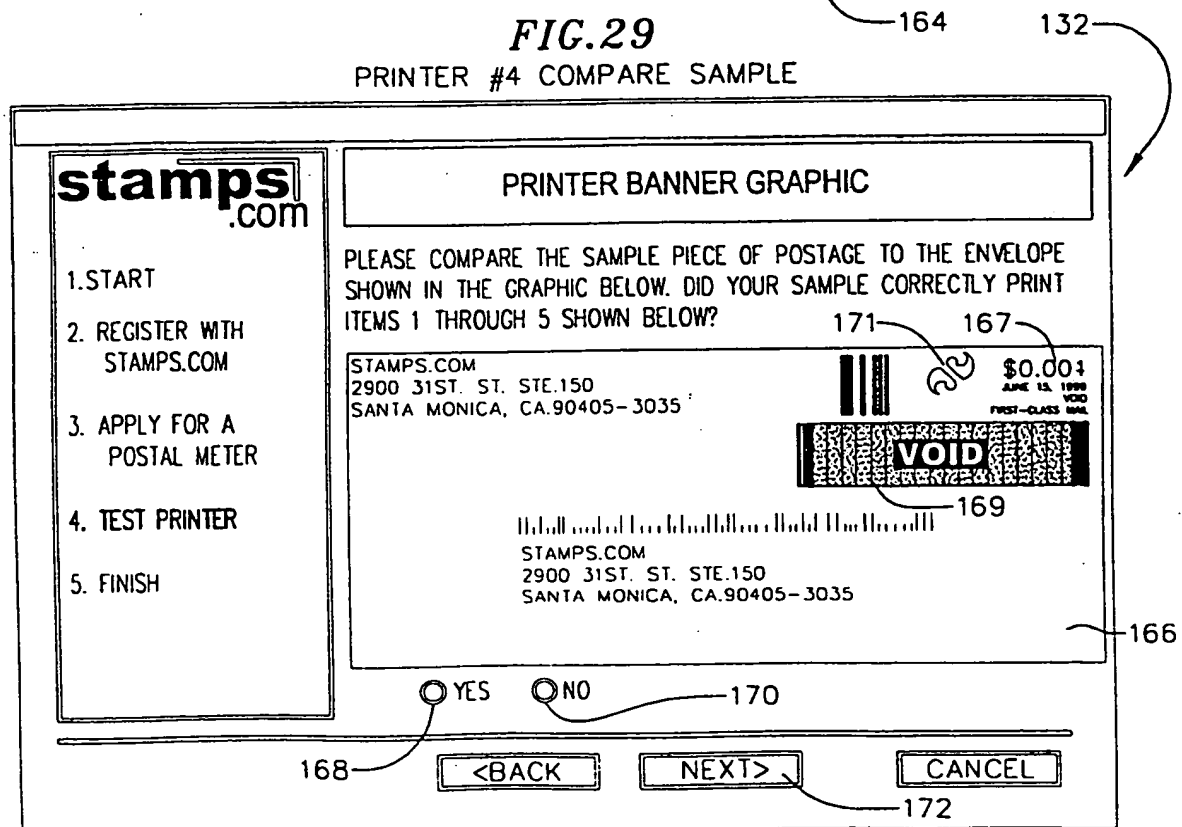
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FIG. 28

PRINTER #3 INSERT ENVELOPE

**FIG. 29**

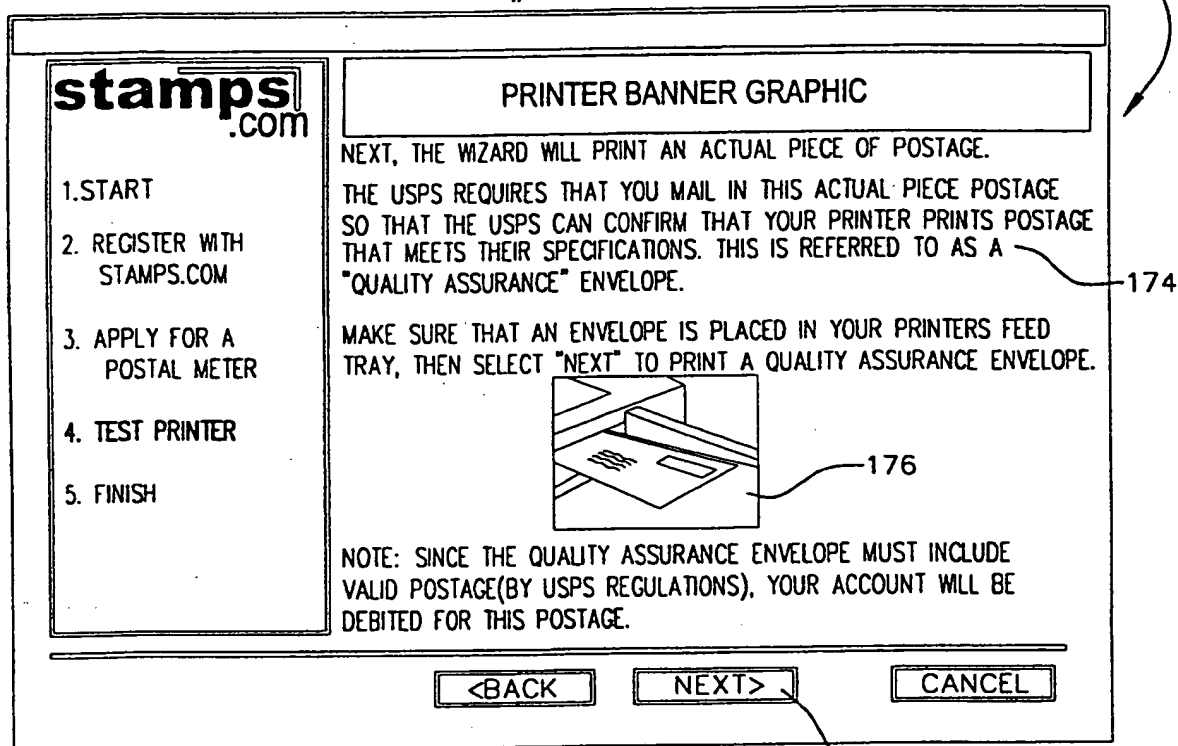
PRINTER #4 COMPARE SAMPLE



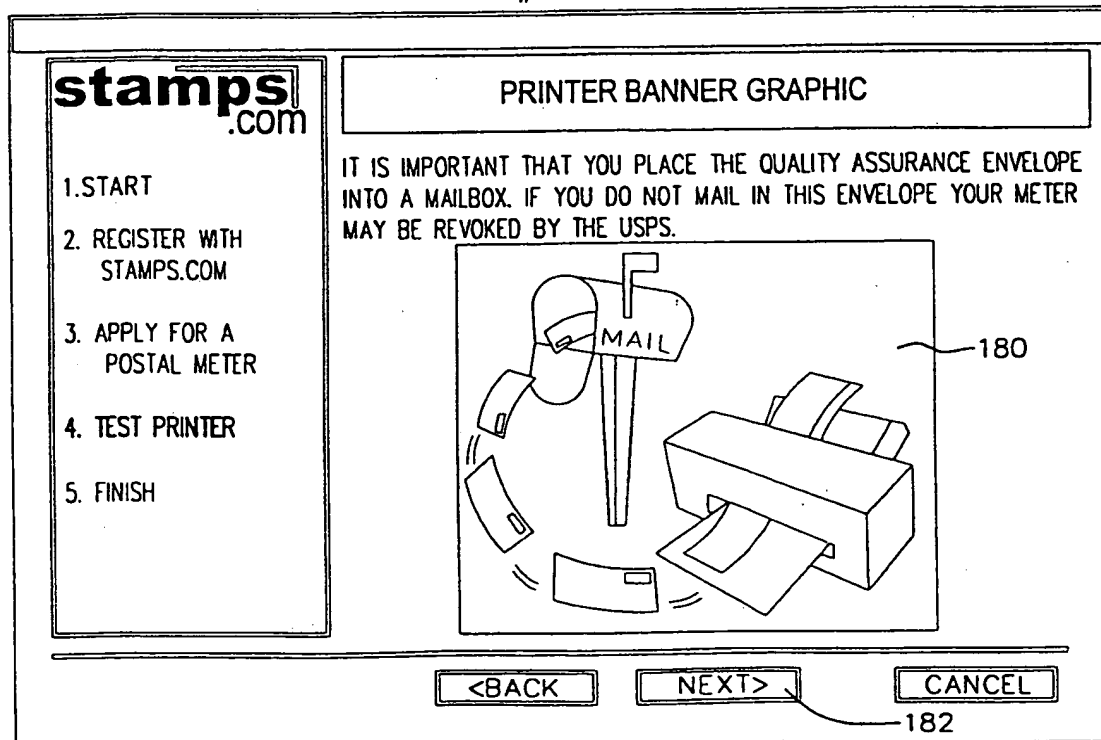
32/39

FIG. 30

PRINTER #5 PRINT QA ENV.

**FIG. 31**

PRINTER #6 MAIL QA ENV.



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FIG.32

FINISH #1 CONGRATS

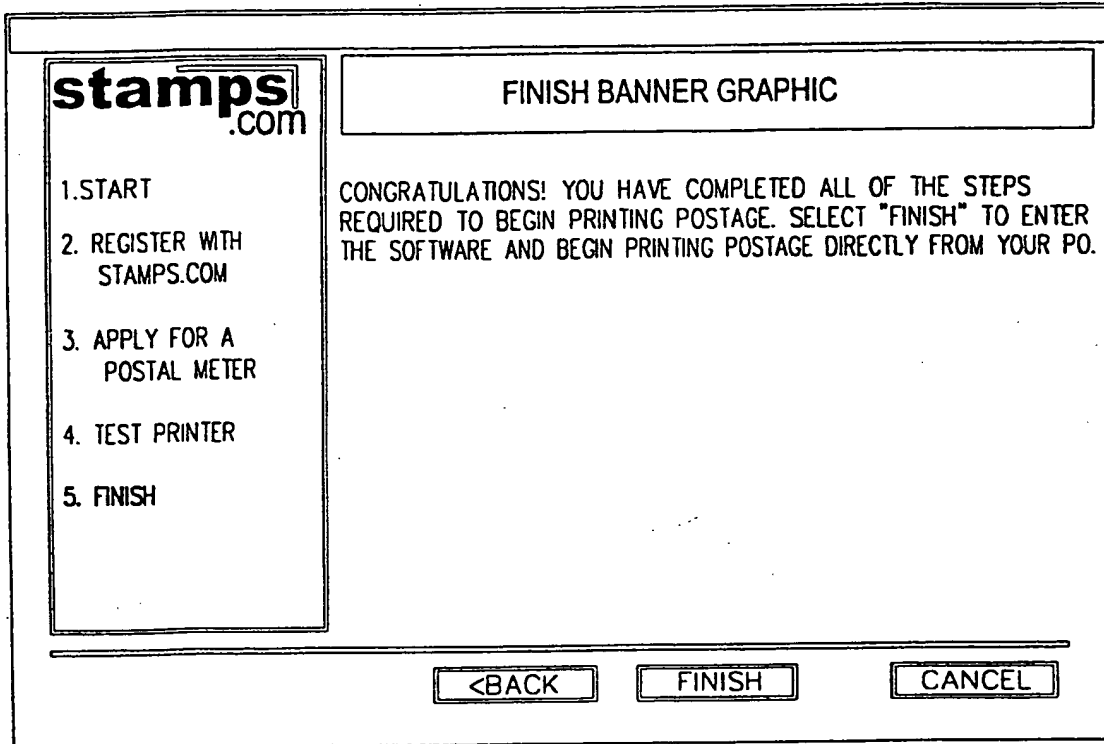
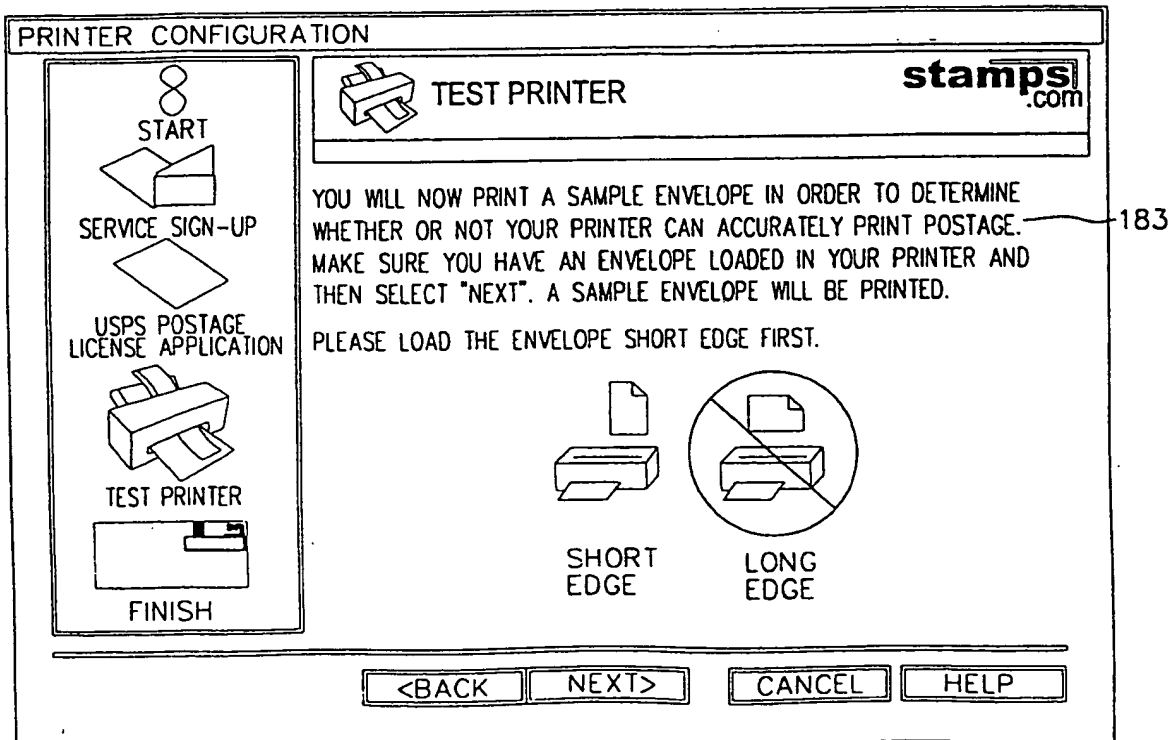
**FIG.34**

FIG. 33

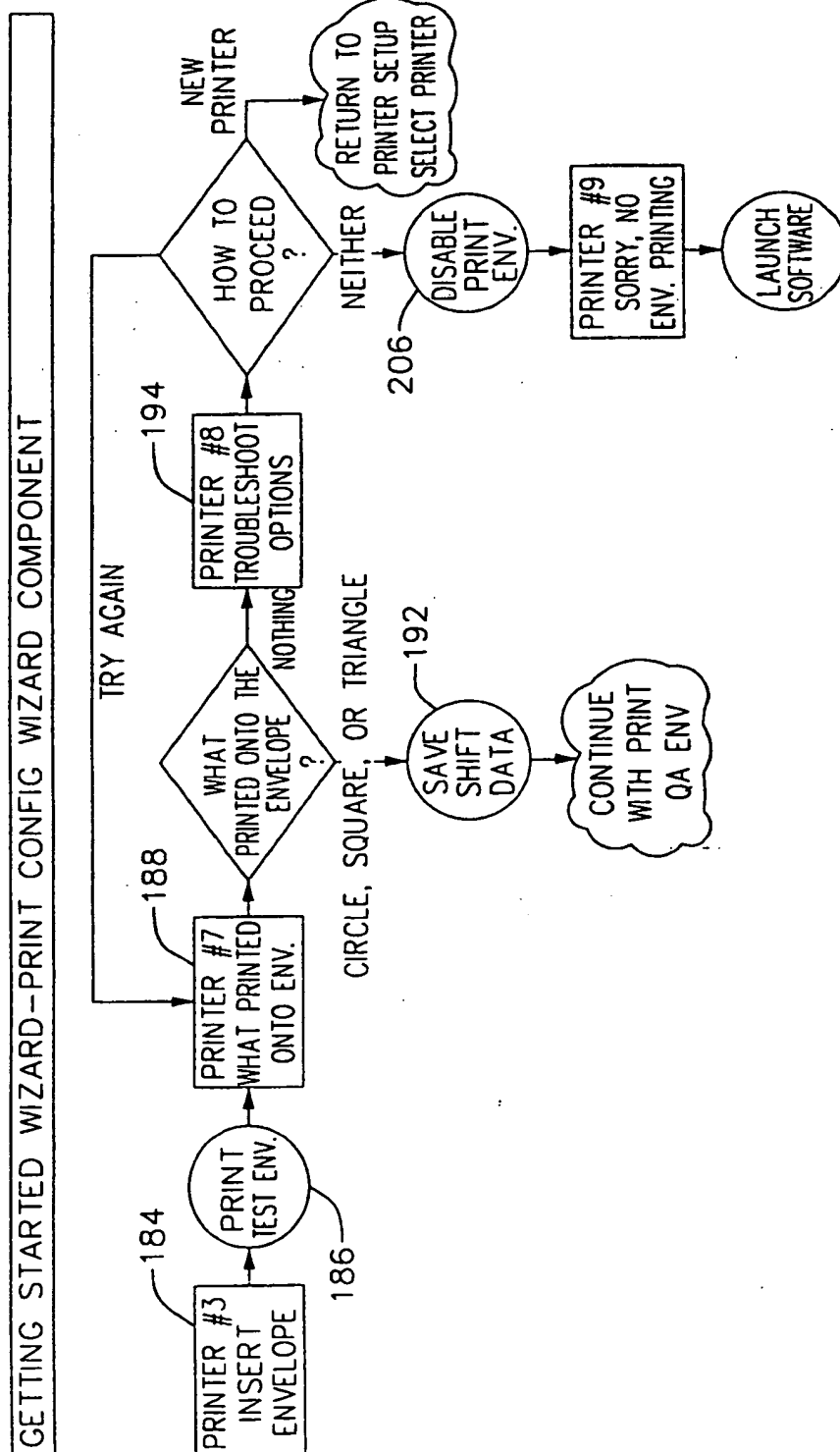
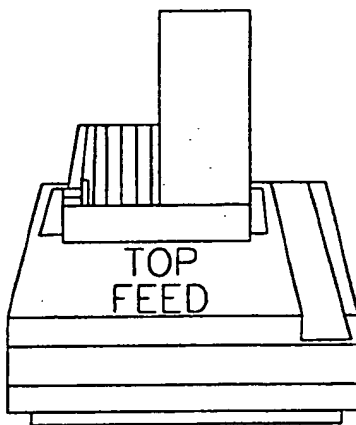


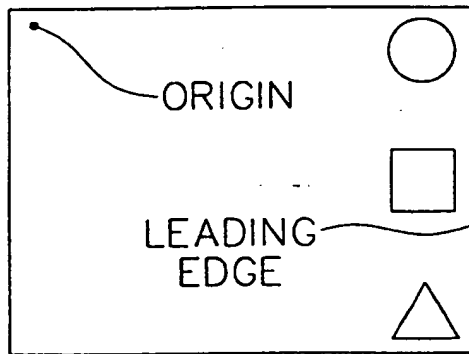
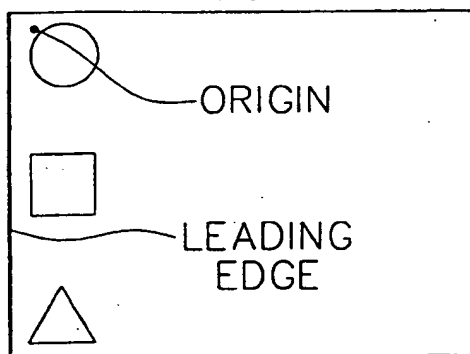
FIG. 35



AVAILABLE PATTERNS VIRTUALIZED ON A SHEET OF PAPER

o@le

!o@le



AN ENVELOPE WITH A CIRCLE PATTERN INDICATES A TOP-FEED PRINTER

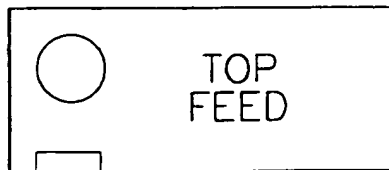
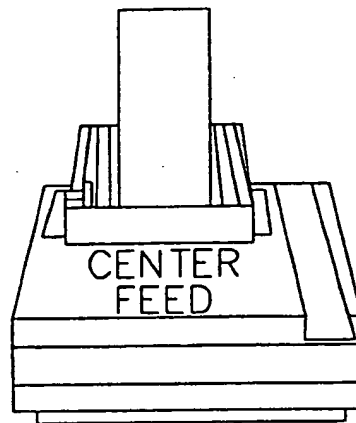
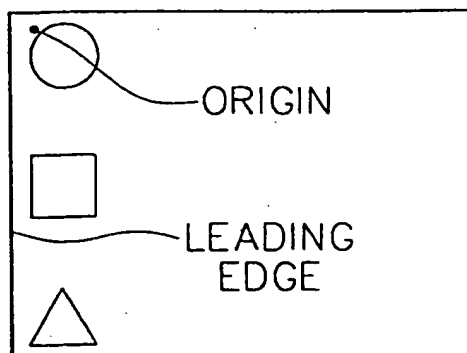


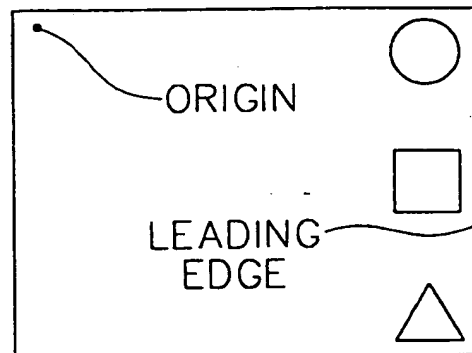
FIG. 36

AVAILABLE PATTERNS VIRTUALIZED ON A SHEET OF PAPER

o@le



!o@le



AN ENVELOPE WITH A SQUARE PATTERN INDICATES A CENTER-FEED PRINTER

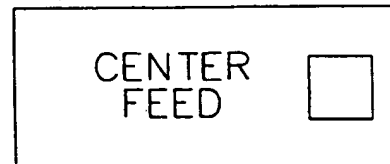
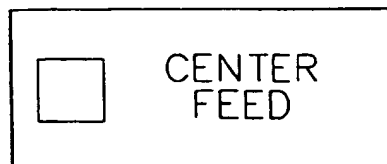
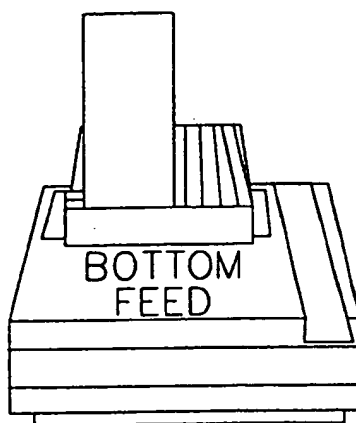
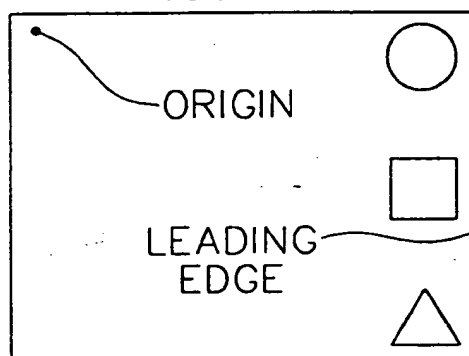
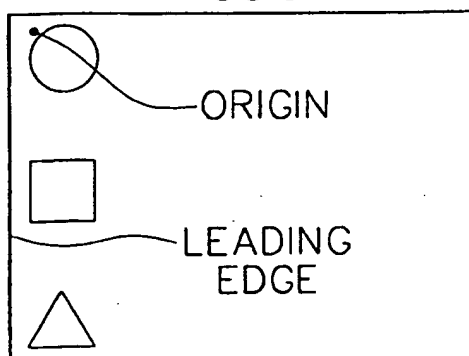


FIG. 37

AVAILABLE PATTERNS VIRTUALIZED ON A SHEET OF PAPER
o@e !o@e



AN ENVELOPE WITH A TRIANGLE PATTERN INDICATES A BOTTOM-FEED PRINTER

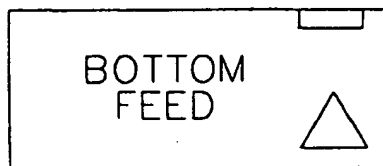
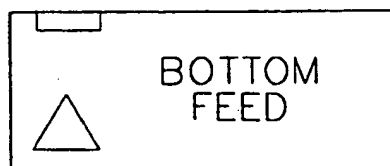


FIG. 38




PRINTER #7 WHAT PRINTED ONTO ENVELOPE

stamps.com

1. START
2. REGISTER WITH STAMPS.COM
3. APPLY FOR A POSTAL METER
4. TEST PRINTER
5. FINISH

PRINTER BANNER GRAPHIC

EXAMINE THE SAMPLE ENVELOPE THAT JUST PRINTED. SELECT THE SHAPE THAT PRINTED COMPLETELY ON THE ENVELOPE. 188

☒  190
☐ 
☐ 
☐ NONE OF THE ABOVE MATCH WHAT I SEE.

<BACK NEXT> CANCEL

FIG. 39

PRINTER #8 TROUBLESHOOT OPTIONS

stamps.com

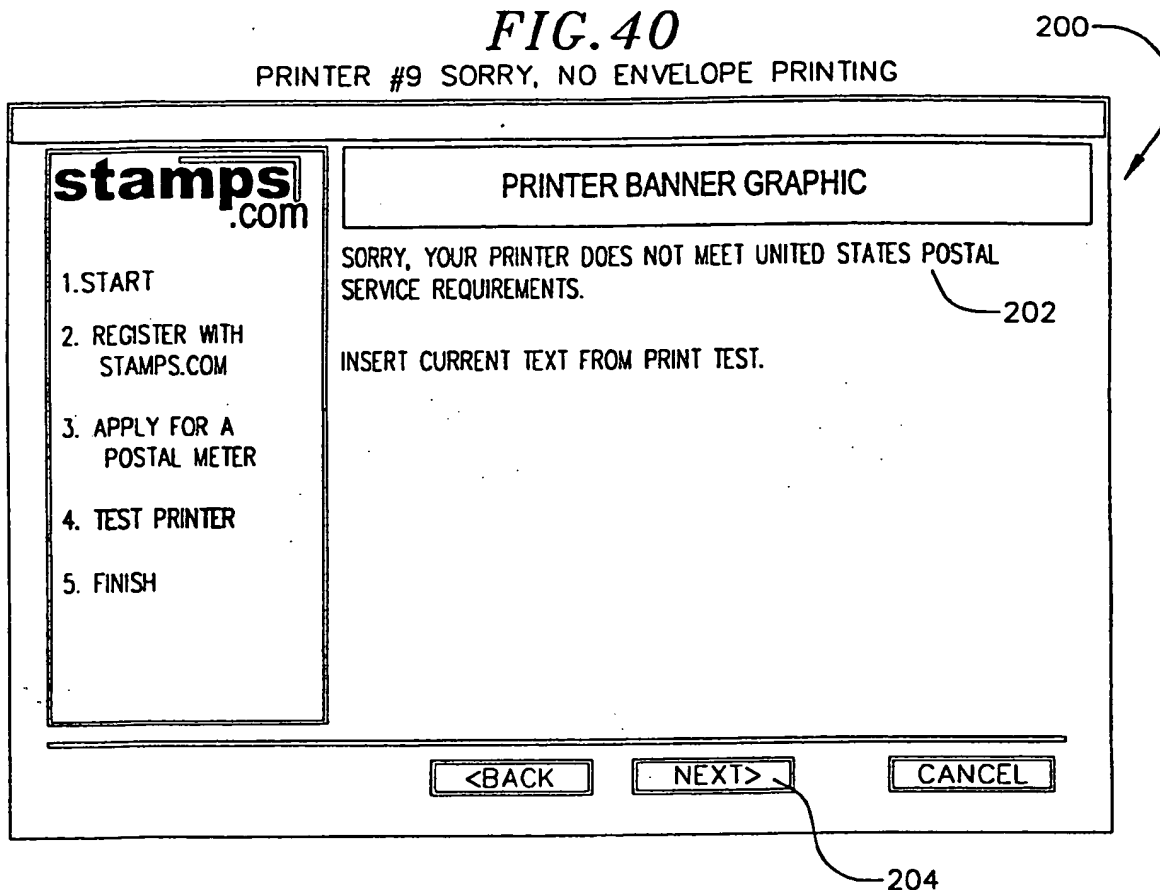
1. START
2. REGISTER WITH STAMPS.COM
3. APPLY FOR A POSTAL METER
4. TEST PRINTER
5. FINISH

PRINTER BANNER GRAPHIC 194

YOUR PRINTER MAY HAVE A PROBLEM PRINTING POSTAGE ON ENVELOPES. TRY ONE OF THESE SOLUTIONS:

198 ☒ TRY PRINTING ANOTHER SAMPLE 196
200 ☐ TRY PRINTING ANOTHER SAMPLE WITH A DIFFERENT PRINTER
☐ NEITHER OF THESE SOLUTIONS WORK

<BACK NEXT> CANCEL

FIG. 40

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/23795

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07B17/00 G06K15/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G07B G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 862 386 A (DURST JR ROBERT T ET AL) 29 August 1989 (1989-08-29)	1-3, 7-11, 13-16, 30-34, 41,42, 47,48, 51-57
Y	column 12, line 24 -column 13, line 33; claims 34,40; figure 5 column 15, line 3 -column 16, line 59 column 25, line 43-66 -- -/--	4-6,12, 18-22, 24-27, 29, 35-39, 43-46, 49,50

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

14 December 2000

Date of mailing of the international search report

21/12/2000

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Fax (+31-70) 340-3016

Authorized officer

Cardigos dos Reis, F

INTERNATIONAL SEARCH REPORT

Internat. Application No

PCT/US 00/23795

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 926 630 A (FRANCOTYP POSTALIA GMBH) 30 June 1999 (1999-06-30) column 1, line 23 -column 2, line 12; figure 3	1-3,10, 11,13, 15,16, 41,42, 47,48, 52,53, 55-57
X	US 4 661 001 A (TAKAI YOSHIHIRO ET AL) 28 April 1987 (1987-04-28)	30-34
Y	abstract; claims 1-26; figures 1,3,4	4,18-22, 24-27, 29, 35-39, 43,45,49
Y	EP 0 923 024 A (CANON KK) 16 June 1999 (1999-06-16) paragraph '0002! - paragraph '0010!	5,6,35, 44,50
Y	EP 0 360 225 A (PITNEY BOWES) 28 March 1990 (1990-03-28)	12,46
A	the whole document	5

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat'l Application No

PCT/US 00/23795

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